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EVOLUTION AND ETHICS.[1]

TO A STRICTLY logical mind the method of the development of thought must be a perplexing, even irritating matter. Its course is not so much like the simple curve described by a bullet as it speeds its way to a mark, as it is like the devious tacking of a sail boat upon a heavy sea with changeable winds. It would be difficult to find a single problem during the whole record of reflective thought which has been pursued consistently until some definite result was reached. It generally happens that just as the problem becomes defined, and the order of battle is drawn, with contestants determined on each side, the whole scene changes; interest is transferred to another phase of the question, and the old problem is left apparently suspended in mid air. It is left, not because any satisfactory solution has been reached; but interest is exhausted. Another question which seems more important has claimed attention. If one, after a generation or a century, reviews the controversy and finds that some consensus of judgment has finally been reached, he discovers that this has come about, not so much through exhaustive logical discussion, as through a change

[1] This paper was delivered as a public lecture during the Summer Quarter's work of the University of Chicago. This will account for the lack of reference to other articles bearing on the subject. I would call special attention, however, to Mr. Leslie Stephen on "Natural Selection and Ethics," in the *Contemporary Review*, and the article by Dr. Carus in *The Monist*, Vol. IV., No. 3, on "Ethics and the Cosmic Order."

in men's points of view. The solution is psychologically, rather than logically, justified.

This general reflexion is called to mind as I undertake the discussion of the question of the relation of evolution and ethics. A generation ago the entire interest was in the exact relation between man and the lower animals. We had one school concerned with reducing this difference to the lowest possible limits and urging that the consciousness of man, intellectual and moral, as well as his physical nature, might be considered a direct inheritance through easy gradations from some form of the anthropoid ape. We had another school equally concerned with magnifying the difference, making it, if possible, an unbridgeable chasm. It would be a bold man who would say that this controversy has been settled by the actual weight of concrete detailed evidence, or even that it has been very far advanced. The writings which really throw light on the question, in either direction (so far as the facts are concerned and not merely general considerations), can probably be easily numbered on the fingers of the two hands. Yet suddenly we find that discussion of this question has practically ceased, and that what engages controversy is the relation of what I may call the evolutionary concepts in general to the ethical concepts. Points of agreement and disagreement between the ideas involved in the notion of evolution and those involved in the notion of moral conduct are searched for. It is the state of the imagination and the direction of interest which have changed.

It is the latter question which I purpose to discuss to-day. This particular phase of the problem was precipitated, if not initiated, by the late Professor Huxley in his Romanes lecture for 1893 on "Evolution and Ethics." It is some points in that address which I shall take as my text,—not for the sake of directly controverting them, but as convenient points of departure for raising the questions which seem to me fundamental. In that lecture, as you will all remember, Mr. Huxley points out in his incisive and sweeping language certain differences between what he terms the cosmic and the ethical processes. Those who recall the discussion following the lecture will remember that many felt as if they had received

a blow knocking the breath out of their bodies. To some it appeared that Mr. Huxley had executed a sudden *volte-face* and had given up his belief in the unity of the evolutionary process, accepting the very dualistic idea of the separation between the animal and the human, against which he had previously directed so many hard blows. To some conservative thinkers it appeared that Saul had finally shown himself among the prophets. The lecture was deplored or welcomed according to the way one interpreted it with reference to his own prepossessions.

The position taken by Huxley, so far as it concerns us here, may be summed up as follows: The *rule* of the cosmic process is struggle and strife. The rule of the ethical process is sympathy and co-operation. The *end* of the cosmic process is the survival of the fittest; that of the ethical, the fitting of as many as possible to survive. Before the ethical tribunal the cosmic process stands condemned. The two processes are not only incompatible but even opposed to each other. "Social progress means the checking of the cosmic process at every step and the substitution for it of another, which may be called the ethical process; the end of which is not the survival of those who happen to be the fittest in respect of the whole of the conditions which exist, but of those who are ethically the best. The practice of that which is ethically best—which we call goodness or virtue—involves a course of conduct which in all respects is opposed to that which leads to success in the cosmic struggle for existence. . . . The cosmic process has no sort of relation to moral ends. The imitation by man is inconsistent with the first principles of ethics. Let us understand once for all that the ethical progress of society depends, not on imitating the cosmic process, still less in running away from it, but in combating it." (*Ethics and Evolution*, pp. 81–83, *et passim.*)

Even in the lecture, however, Mr. Huxley used certain expressions which show that he did not hold to this opposition in a sense which meant the surrender of his previous evolutionary convictions. Thus he says that the ethical process, "strictly speaking, is part of the general cosmic process, just as the governor in a steam engine is part of the mechanism of the engine." (Note, p. 115.) In

a later essay (published as Prolegomena), aroused somewhat by the clamour which the lecture had called forth, he makes his position even clearer. Here he illustrates his meaning by referring to the two hands as used in stretching or pulling. Each is opposed to the other, and yet both are manifestations of the same original force (p. 13). It is not that the ethical process is opposed to the entire cosmic process, but that *part* of the cosmic process which is maintained in the conduct of men in society, is radically opposed both in its methods and its aims to that *part* of the cosmic process which is exhibited in the stages of evolution prior to the appearance of socialised man upon the scene.

He makes this point clearer by reference to the analogy of a garden. (Pp., 9–11.) Through the cosmic process, independent of man, certain plants have taken possession of a piece of soil because they are adapted to that particular environment. Man enters and roots out these plants as noxious weeds, or at least as useless for his purposes. He introduces other plants agreeable to his own wants and aims, and proceeds at once to modify the environment; if necessary, changing the soil by fertilisation, building walls, altering conditions of sunlight and moisture so as to maintain his garden as a work of art—an artifice. This artificial structure, the one mediated by man's aims and efforts, is so opposed to the natural state of things that if man lets up in the ardor, the continuity, of his labors, the natural forces and conditions reassert themselves, the wall crumbles, the soil deteriorates, and the garden is finally once more overgrown with weeds.

Mr. Huxley is a trenchant writer, and his illustrations hold the mind captive. But possibly further consideration of this very illustration will point to a different conclusion. Illustrations are two-edged swords. There is no doubt in my mind of the justness of the analogy. The ethical process, like the activity of the gardener, is one of constant struggle. We can never allow things simply to go on of themselves. If we do, the result is retrogression. Oversight, vigilance, constant interference with conditions as they are, are necessary to maintain the ethical order, as they are to keep up the garden. The problem, however, is to locate this opposition

and interference,—to interpret it, to say what it means in the light of our idea of the evolutionary process as a whole.

Thus considering the illustration, the thought suggests itself that we do not have here in reality a conflict of man as man with his entire natural environment. We have rather the modification by man of one part of the environment with reference to another part. Man does not set himself against the state of nature. He utilises one part of this state in order to control another part. It still holds that "nature is made better by no mean, but nature makes that mean." The plants which the gardener introduces, the vegetables and fruits he wishes to cultivate, may indeed be foreign to this particular environment; but they are not alien to man's environment as a whole. He introduces and maintains by art conditions of sunlight and moisture to which this particular plot of ground is unaccustomed; but these conditions fall within the wont and use of nature as a whole.

These may appear as too obvious considerations to be worth mentioning. Surely they could not have escaped Mr. Huxley for a moment. Yet it is possible that their bearing escaped him; for, if I mistake not, when we allow our mind to dwell upon such considerations as these, the entire import of the illustration changes. We are led to conceive, not of the conflict between the garden and the gardener; between the natural process and the process of art dependent upon human consciousness and effort. Our attention is directed to the possibility of interpreting a narrow and limited environment in the light of a wider and more complete one,—of reading the possibilities of a part through its place in the whole. Human intelligence and effort intervene, not as opposing forces but as making this connexion. When Huxley says that "the macrocosm is "pitted against the microcosm; that man is subduing nature to his "higher ends; that the history of civilisation details the steps by "which we have succeeded in building up an artificial world within "the cosmos; that there lies within man a fund of energy operat-"ing intelligently and so far akin to that which pervades the uni-"verse that it is competent to influence and modify the cosmic "process,"—he says to my mind that man is an organ of the cos-

mic process in effecting its *own* progress. This progress consists essentially in making over a part of the environment by relating it more intimately to the environment as a whole; not, once more, in man setting himself against that environment.

Huxley himself defines the issue in words already quoted in which he contrasts the survival of those who "may happen to be the fittest *in respect of the whole of the conditions which exist*, to the survival of those who are ethically the best." The clause italicised sums up the whole problem. It is granted without argument that the fittest with respect to a limited part of the environment are not identical with the ethically best. Can we make this concession, however, when we have in mind the whole of the existing conditions? Is not the extent to which Mr. Huxley pushes his dualistic opposition, are not many of the popular contrasts between the natural and the ethical, results of taking a limited view of the conditions with respect to which the term "fit" is used? In cosmic nature, as Mr. Huxley says, what is fittest depends upon the conditions. If our hemisphere were to cool again, the "survival of the fittest might leave us with nothing but lichens, diatomes, and such microscopic organisms as that which gives red snow its color." We cannot work this idea one way without being willing to work it in the other. The conditions with respect to which the term "fit" must *now* be used include the existing social structure with all the habits, demands, and ideals which are found in it. If so, we have reason to conclude that the "fittest with respect to the whole of the conditions" is the best; that, indeed, the only standard we have of the best is the discovery of that which maintains these conditions in their integrity. The unfit is practically the anti-social.

Loose popular argument—Mr. Huxley himself hardly falls into the pit—is accustomed to suppose that if the principle of the struggle for existence and survival of the fittest were rigorously carried out, it would result in the destruction of the weak, the sickly, the defective, and the insane. An examination of this popular assumption may serve to illuminate the point just made. We are all familiar with Fiske's generalisation that civilisation is a pro-

duct of the prolongation of the period of infancy; that the necessity of caring for offspring not able to take care of themselves, during a continually lengthening period, stimulated the affection and care, the moral germs of social life, and required the foresight and providence that were the germs of the industrial arts upon which society depends. Mr. Fiske's contention, whether true or false, is worth putting over against the popular assumption. How far are we to go in the destruction of the helpless and dependent in order that the "fit" may survive? Clearly in this case the infant was one who was "fit," not only in ethical terms but in terms of furthering the evolutionary process. Is there any reason to suppose that the dependent classes are not equally "fit" at present, when measured by the whole of the conditions as a standard?

We may imagine a leader in an early social group, when the question had arisen of putting to death the feeble, the sickly, and the aged, in order to give that group an advantage in the struggle for existence with other groups;—we may imagine him, I say, speaking as follows: "No. In order that we may secure this advantage, let us preserve these classes. It is true for the moment that they make an additional drain upon our resources, and an additional tax upon the energies which might otherwise be engaged in fighting our foes. But in looking after these helpless we shall develop habits of foresight and forethought, powers of looking before and after, tendencies to husband our means, which shall ultimately make us the most skilled in warfare. We shall foster habits of group loyalty, feelings of solidarity, which shall bind us together by such close ties that no social group which has not cultivated like feelings through caring for all its members, will be able to withstand us." In a word, such conduct would pay in the struggle for existence as well as be morally commendable.

If the group to which he spoke saw any way to tide over the immediate emergency, no one can gainsay the logic of this speech. Not only the prolongation of the period of dependence, but the multiplication of its forms, has meant historically increase of intelligent foresight and planning, and increase of the bonds of social

unity. Who shall say that such qualities are not positive instruments in the struggle for existence, and that those who stimulate and call out such powers are not among those "fit to survive"? If the deer had never developed his timidity and his skill in running away, the tiger and the wolf had never shown their full resources in the way of courage and power of attack. Again, prevention is better than cure, but it has been through trying to cure the sick that we have learned how to protect the well.

I have discussed this particular case in the hope of enlarging somewhat our conception of what is meant by the term "fit"; to suggest that we are in the habit of interpreting it with reference to an environment which long ago ceased to be. That which was fit among the animals is not fit among human beings, not merely because the animals were non-moral and man is moral; but because the conditions of life have changed, and because there is no way to define the term "fit" excepting through these conditions. The environment is now distinctly a social one, and the content of the term "fit" has to be made with reference to social adaptation. Moreover, the environment in which we now live is a changing and progressive one. Every one must have his fitness judged by the whole, including the anticipated change; not merely by reference to the conditions of to-day, because these may be gone to-morrow. If one is fitted simply to the present, he is not fitted to survive. He is sure to go under. A part of his fitness will consist in that very flexibility which enables him to adjust himself without too much loss to sudden and unexpected changes in his surroundings. We have then no reason here to oppose the ethical process to the natural process. The demand is for those who are fit for the conditions of existence in one case as well as in the other. It is the conditions which have changed.[1]

[1] Precisely it may be said, and that is just the reason that Mr. Huxley insists upon the opposition of the natural and the ethical. I cannot avoid believing that this is what Mr. Huxley really had in mind at the bottom of his consciousness. But what he says is not that the form and content of fitness, of struggle for existence, and of selection, change with the change of conditions, but that these concepts lose all applicability. And this is just the point under discussion.

Let us turn our attention from the idea of "fitness" to that of the process or method—the "struggle for existence." Is it true that in the moral sphere the struggle must cease, or that we must turn ourselves resolutely upon it, branding it as immoral? Or, as in the case of the idea of fitness, is this struggle as necessary to the ethical as it is to the biological? In reality, the idea of struggle for existence is controlled by the environment in which that struggle is put forth. That which is struggle for life, and successful struggle, at one time, would be inert supineness or suicidal mania at another. This is as true of varying periods in animal development as it is of the human contrasted with the animal. The nature of the struggle for existence is constantly modifying itself, not because something else is substituted for it, much less opposed to it; but because as the conditions of life change, the modes of living must change also. That which would count in the Carboniferous period will not count in the Neozoic. Why should we expect that which counts among the carnivora to count with man,—a social animal? If we do not find the same qualities effective (and hence to be maintained) in both cases; or if we find that opposed qualities are called for, what right have we to assume that what was once effected by the struggle for existence has now to be accomplished by another and opposed force?

The term "struggle for existence" seems to be used in two quite different senses by Mr. Huxley. In one case it means practically simply self-assertion. I do not see that the *struggle* for existence is anything more than living existence itself. Life tends to maintain itself because it is life. The particular acts which are put forth are the outcome of the life that is there; they are its expression, its manifestation.

Self-assertion in this sense carries with it no immoral connotation, unless life by its very nature is immoral. But Huxley also uses "struggle for existence" with a distinctly selfish meaning. He speaks of the "ape and tiger promptings" as branded with the name of sins. (P. 52.) He identifies self-assertion with "the unscrupulous seizing upon all that can be grasped; the tenacious holding of all that can be kept." (P. 51.) It is "ruthless." It

"thrusts aside or treads down all competitors." It "involves the gladiatorial theory of existence." (P. 82.) Hence it is a "powerful and tenacious enemy to the ethical." (P. 85.)

Surely, all this is rhetoric rather than philosophy or science. We inherit our impulses and our tendencies from our ancestors. These impulses and tendencies need to be modified. They need to be curbed and restrained. So much goes without saying. The question is regarding the nature of the modification; the nature of the restraint, and its relation to the original impulses of self-assertion. Surely, we do not want to suppress our animal inheritance; nor do we wish to restrain it absolutely,—that is, for the mere sake of restraint. It is not an enemy to the moral life, simply because without it no life is possible. Whatever is necessary to life we may fairly assume to have some relevancy to moral living. More than this is true. That self-assertion which we may call life is not only negatively, but positively a factor in the ethical process. What are courage, persistence, patience, enterprise, initiation, but forms of the self-assertion of those impulses which make up the life process? So much, I suppose, all would grant; but are temperance, chastity, benevolence, self-sacrifice itself, any less forms of self-assertion? Is not more, rather than less strength, involved in their exercise? Does the man who definitely and resolutely sets about obtaining some needed reform and with reference to that need sacrifices all the common comforts and luxuries of life, even for the time being social approval and reputation, fail in the exercise of self-assertion?

The simple fact of the case is of course that these promptings, even the promptings of the "tiger and the ape," are, simply as promptings, neither moral nor immoral; no more sins than they are saintly attributes. They are the basis and material of all acts whatsoever, good and bad. They become good when trained in a certain way, just as they become bad when trained in another way. The man who regards his animal inheritance as evil in and of itself apart from its relation to aims proposed by his intelligence, has logically but one recourse,—to seek Nirvana.[1] With him the prin-

[1] It is passing strange that Mr. Huxley should not have seen that the logical conclusion from his premises of this extreme opposition are just those which he has

ciple of self-negation becomes absolute. But with all others, the men and women whom Mr. Huxley is presumably addressing, self-restraint is simply a factor within self-assertion. It relates to the particular ways in which self-assertion is made.

I may appear here to have ignored Huxley's distinction between the struggle for existence and the struggle for happiness (p. 40). The former it will be said, he uses in a definite technical sense as meaning simply the struggle for the perpetuation of life, apart from the kind of life led, and as exhibiting itself in direct conflict with others, leading to the elimination of some. That struggle for existence it may be surely said, is not to be continued within the ethical process. The struggle for existence relates, he says, simply to the "means of living." Besides that we have the struggle for happiness, having to do with the uses to which these means are put,—the values which are got out of them, the ends.

I reply in the first place, that Mr. Huxley contradicts himself on this point in such a way that one would be quite justified in ignoring the distinction; and in the second place, that I am not able to see the validity of the distinction.

As to Mr. Huxley's self-contradiction, he asserts in a number of places that the struggle for existence as such (as distinct from the struggle for happiness) has now come to an end. It held only in the lower social forms when living was so precarious that people actually killed each other, if not for food, at least to secure the scanty store of food available. If it holds now at all it is simply among the small criminal class in society (p. 41). Now Mr. Huxley not only takes this position, but from a certain point of view is bound to take it. If the struggle is still going on, selection is still occurring, and there is every reason to suppose that as heretofore, it is a distinct agent in social progress; and Mr. Huxley is bound to hold that natural selection no longer operates in social progress and that therefore we must have recourse to other means. But if the struggle for existence has thus ceased of itself within any given

himself set forth with such literary power earlier in his essay (pp. 63–68). That he did not shows, to my mind, how much he takes the opposition in a rhetorical, not a practical, sense.

human society, what sense is there in saying that it is now "a tenacious and powerful enemy with which ethical nature has to reckon"? If it has died out because of the change of conditions, why should the ethical process have to spend all its energy in combating it? "Let the dead bury their dead."[1]

In other words, Mr. Huxley himself is practically unable to limit the meaning of the phrase "struggle for existence" to this narrow import. He has himself to widen it so as to include not only the struggle for mere continuance of physical existence, but also whatever makes that life what it is. The distinction between the struggle for existence and the struggle for happiness breaks down. It breaks down, I take it, none the less in animal life itself than it does in social life. If the struggle for existence on the part of the wolf meant simply the struggle on his part to keep from dying, I do not doubt that the sheep would gladly have compromised at any time upon the basis of furnishing him with the necessary food—including even an occasional bowl of mutton broth. The fact is the wolf asserted himself as a wolf. It was not mere life he wished, but the life of the wolf. No agent can draw this distinction between desire for mere life and desire for happy life for himself; and no more can the spectator intelligently draw it for another.

What then is the conflict, the tension, which is a necessary factor in the moral life—for be it remembered there is no difference of opinion with Mr. Huxley upon this point? The sole question is whether the combat is between the ethical process as such, and the cosmic, natural, process as such. The outcome of our previous discussion is that it cannot be the latter because the natural process, the so-called inherited animal instincts and promptings, are not only the stimuli, but also the materials, of moral conduct. To weaken them absolutely, as distinct from giving them a definite turn or direction, is to lessen the efficiency of moral conduct. Where then does the struggle come in? Evidently in the particu-

[1] Here is his flat contradiction: "Men in society are undoubtedly subject to the cosmic process. . . . The struggle for existence tends to eliminate those less fitted to adapt themselves to the circumstances of their existence" (p. 81). Compare this with pp. 15, 36, 38, and the other passages referred to above.

lar turn or direction which is given to the powers of the animal nature making up the immediate content of self-assertion. But once more, what does this turn or direction mean? Simply, I take it, that an act which was once adapted to given conditions must now be adapted to other conditions. The effort, the struggle, is a name for the necessity of this re-adaptation.[1] The conditions which originally called the power forth, which led to its "selection," under which it got its origin, and formation, have ceased to exist, not indeed, wholly, but in such part that the power is now more or less irrelevant. Indeed, it is not now a "power" in the sense of being a function which can without transformation operate successfully with reference to the whole set of existing conditions. Mr. Huxley states the whole case when he says that "in extreme cases man does his best to put an end to the survival of the fittest of former days by the axe and rope." The phrase, "the fittest of *former* days" contains the matter in a nut-shell. Just because the acts of which the promptings and impulses are the survival, were the fittest for by-gone days they are not the fittest now. The struggle comes, not in suppressing them nor in substituting something else for them; but in reconstituting them, in adapting them, so that they will function with reference to the existing situation.

This, I take it, is the truth, and the whole truth, contained in Mr. Huxley's opposition of the moral and the natural order. The tension is between an organ adjusted to a past state and the functioning required by present conditions. And this tension demands reconstruction. This opposition of the structure of the past and the deeds of the present is precisely that suggested in the discussion of the illustrative garden. The past environment is related to the present as a part to a whole. When animal life began on land, water became only one factor in the conditions of life, and the animal attitude towards it was changed. It certainly could not now get along without a water-environment, much less could it turn against it; but its relations to moisture as a condition of life were

[1] I have developed this conception psychologically in the *Philosophical Review* for Jan. 1897, in an article upon the Psychology of Effort.

profoundly modified. An embryonic Huxley might then have argued that the future success of animal life depended upon combating the natural process which had previously maintained and furthered it. In reality the demand was, that which was only a part should be treated as such, and thus subordinated to the whole set of conditions.

Thus when Mr. Huxley says (p. 12) that "nature is always tending to reclaim that which her child, man, has borrowed from her and has arranged in combinations which are not those favored by the general cosmic process," this only means that the environment *minus* man is not the same environment as the one that includes man. In any other sense these "combinations" *are* favored by the general cosmic process,—in witness whereof man through whom that process works has set his sign and seal. That *if* you took man out of this process things would change, is much like saying that if they were different they would not be the same; or, that a part is not its own whole.

There are many signs that Mr. Huxley had Mr. Spencer in mind in many of his contentions; that what he is really aiming at is the supposition on the part of Mr. Spencer that the goal of evolution is a complete state of final adaptation in which all is peace and bliss and in which the pains of effort and of reconstruction are known no more. As against this insipid millennium, Mr. Huxley is certainly right in calling attention to the fact that the ethical process implies continual struggle, conquest, and the defeats that go with conquest. But when Mr. Huxley asserts that the struggle is between the natural process and the ethical, we must part company with him. He seems to assert that in some far century it may be possible for the ape and the tiger to be so thoroughly subjugated by man that the "inveterate enemy of the moral process" shall finally be put under foot. Then the struggle will occur against the environment because of a shortage of food. But we must insist that Mr. Huxley is here falling into the very charges which he has brought against Mr. Spencer's school. The very highest habits and ideals which are organising to-day with reference to existing conditions will be just as much, and just as little, an obstacle to

the moral conduct of man millions of years from now, as those of the ape and the tiger are to us. So far as they represent the survival of outworn conditions, they will demand re-constitution and re-adaptation, and that modification will be accompanied by pain. Growth always costs something. It costs the making over of the old in order to meet the demands of the new.

This struggle, then, is not more characteristic of the ethical process than it is of the biological. Long before man came upon the earth, long before any talk was heard of right and wrong, it happened that those who clung persistently to modes of action which were adapted to an environment that had passed away, were at a disadvantage in the struggle for existence, and tended to die out. The factors of the conflict upon which Mr. Huxley lays so much stress have been present ever since the beginning of life and will continue to be present as long as we live in a moving, and not a static world. What he insists upon is reconstruction and readaptation,—modification of the present with reference to the conditions of the future.

With the animal it was simply the happy guess,—the chance. In society there is anticipation; with man it is the intelligent and controlled foresight, the necessity of maintaining the institutions which have come down to us, while we make over these institutions so that they serve under changing conditions. To give up the institutions is chaos and anarchy; to maintain the institutions unchanged is death and fossilisation. The problem is the reconciliation of unbridled radicalism and inert conservatism, in a movement of reasonable reform. Psychologically the tension manifests itself as the conflict between habits and aims: a conflict necessary, so far as we can see, to the maintenance of conscious life. Without habits we can do nothing. Yet if habits become so fixed that they cannot be adapted to the ends suggested by new situations, they are barriers to conduct and enemies to life. It is conflict with the end or ideal which keeps the habit working, a flexible and efficient instrument of action. Without this conflict with habits, the end becomes vague, empty, and sentimental. Defining it so that the

habits may be utilised in realising it makes it of practical value. This definition would never occur were it not that habits resist it.

Just as habits and aims are co-operating factors in the maintenance of conscious experience, just as institutions and plans of reform are co-workers in our social life, just as the relative antagonism between the two is necessary to their valuable final co-adaptation; so impulse, call it animal if we will, and ideal, call it holy though we may, are mutually necessary in themselves and in their mutual opposition,—necessary for the ethical process. It is well for the ideal that it meet the opposition of the impulse, as it is for the animal prompting to be held to the function suggested by the ideal.

In locating and interpreting this tension, this opposition between the natural and the moral, I have done what I set out to do. There is one other point which it seems worth while to touch upon before leaving the matter. Three terms are always found together in all discussions of evolution,—natural selection, struggle for existence, and the fit. The latter two of these ideas we have discussed in their bearings upon moral life. It remains to say a word or two upon natural selection. Mr. Huxley's position on this point is not quite clear. As has been already suggested, it seems to be varying, if not actually self-contradictory. At times he seems to hold that since the struggle for existence has ceased in the social sphere, selection has ceased also to act, and therefore the work formerly done by it (if we may for the moment personify it as an agent) now has to be done in other ways. (See the passages referred to on p. 331). At other times he seems to hold that it is still going on but that its tendency upon the whole is bad, judged from the ethical standpoint, and therefore requires to be consciously counteracted.

Certainly the question of the scope of selection in the sphere of social life is confused. Does it still continue or does it not? If it does operate what are its modes of working? Many seem to suppose that we do not have it excepting where we intentionally isolate those whom we consider unfit, and prevent them from reproducing offspring; or that it is found only if we artificially regulate

marriage in such a way as to attempt to select social and animal types considered higher at the expense of the lower. Mr. Huxley naturally considers selection in this sense, not only practically impossible, but intrinsically undesirable. But is this the only or the chief meaning of natural selection? Does it follow that social selection, to use a term employed by late writers, is something radically different from natural selection?

The belief that natural selection has ceased to operate rests upon the assumption that there is only one form of such selection: that where improvement is indirectly effected by the failure of species of a certain type to continue to reproduce; carrying with it as its correlative that certain variations continue to multiply, and finally come to possess the land. This ordeal by death is an extremely important phase of natural selection, so called. That it has been the chief form in pre-human life will be here admitted without discussion; though doubtless those having competent knowledge of details have good reason for qualifying this admission. However, to identify this procedure absolutely with selection, seems to me to indicate a somewhat gross and narrow vision. Not only is one form of life as a whole selected at the expense of other forms, but one mode of action in the same individual is constantly selected at the expense of others. There is not only the trial by death, but there is the trial by the success or failure of special acts—the counterpart, I suppose, of physiological selection so called. We do not need to go here into the vexed question of the inheritance of acquired characters. We know that through what we call public opinion and education certain forms of action are constantly stimulated and encouraged, while other types are as constantly objected to, repressed, and punished. What difference in principle exists between this mediation of the acts of the individual by society and what is ordinarily called natural selection, I am unable to see. In each case there is the reaction of the conditions of life back into the agents in such a way as to modify the function of living. That in one case this modification takes place through changes in the structure of the organ, say the eye, requiring many generations to become active; while in the other case it operates within the

life of one and the same individual, and affects the uses to which the eye is put rather than (so far as we can tell) the structure of the eye itself, is not a reason for refusing to use the term "natural selection." Or if we have limited that term to a narrower technical meaning, it is certainly no reason for refusing to say that the same kind of forces are at work bringing about the same sort of results. If we personify Nature, we may say that the influences of education and social approval and disapproval in modifying the behavior of the agent, mark simply the discovery on the part of Nature of a shorter and more economical form of selection than she had previously known. The modification of structure is certainly not an end in itself. It is simply one device for changing function. If other means can be devised which do the work more efficiently, then so much the better. Certainly it marks a distinct gain to accomplish this modification in one and the same generation rather than to have to trust to the dying out of the series of forms through a sequence of generations. It is certainly implied in the idea of natural selection that the most effective modes of variation should themselves be finally selected.

But Mr. Huxley insists upon another distinction. Stated in terms of the garden illustration, it is that: "The tendency of the cosmic process is to bring about the adjustment of the forms of plant life to the current conditions; the tendency of the horticultural process is the adjustment of the needs of the forms of plant life which the gardener desires to raise." This is a very common antithesis. But is it as absolute and sweeping as we generally affect to believe? Every living form is dynamically, not simply statically, adapted to its environment. I mean by this it subjects conditions about it to its own needs. This is the very meaning of "adjustment"; it does not mean that the life-form passively accepts or submits to the conditions just as they are, but that it functionally subordinates these natural circumstances to its own food needs.

But this principle is of especial importance with reference to the forms in which are found the lines of progressive variation. It is, relatively speaking, true of the weeds and gorse of the patch of soil from which Mr. Huxley draws his illustration, that they are ad-

justed to current conditions. But that is simply because they mark the result, the relatively finished outcome of a given process of selection. They are arrested forms. Just because the patch has got into equilibrium with surrounding conditions progressive variation along that line has ceased. If this were all the life in existence, there would be no more evolution. Something, in other words, did *not* adapt itself to "current conditions," and so development continued.

It would be ungrateful in any discussion of this subject not to refer to Malthus's classic illustration of the feast spread by nature —not big enough for the invited guests. It is supposed, in its application to struggle for existence and selection, that this means that the life-forms present struggle just to get a share of the food that is already there. Such a struggle for a quota of food already in existence, might result, through selection, in perfecting a species already in existence, and thus in fixing it. It could not give rise to a new species. The selection which marks progress is that of a variation which *creates* a new food supply or amplifies an old one. The advantage which the variation gives, if it tends towards a new species, is an organ which opens up a wider food environment, detects new supplies within the old, or which makes it possible to utilise as food something hitherto indifferent or alien. The greater the number of varieties on a given piece of soil, the more individuals that can maintain a vigorous life. *The new species means a new environment to which it adjusts itself without interfering with others.* So far as the progressive varieties are concerned, it is not in the least true that they simply adapt themselves to current conditions; evolution is a continued development of new conditions which are better suited to the needs of organisms than the old. The unwritten chapter in natural selection is that of the evolution of environments.

Now, in man we have this power of variation and consequent discovery and constitution of new environments set free. All biological process has been effected through this, and so every tendency which forms this power is selected; in man it reaches its climax. So far as the individual is concerned, the environment

(the specific conditions which relate to his life) is highly variable at present. The growth of science, its application in invention to industrial life, the multiplication and acceleration of means of transportation and intercommunication, have created a peculiarly unstable environment. It shifts constantly within itself, or qualitatively, and as to its range, or quantitatively. Simply as an affair of nature, not of art (using these terms in Mr. Huxley's sense) it is a profitable, an advantageous thing that structural changes, if any occur, should not get too set. They would limit unduly the possibility of change in adaptation. In the present environment, flexibility of function, the enlargement of the range of uses to which one and the same organ, grossly considered, may be put, is a great, almost the supreme, condition of success. As such, any change in that direction is a favorable variation which must be selected. In a word, the difference between man and animal is not that selection has ceased, but that selection along the line of variations which enlarge and intensify the environment is active as never before.

We reach precisely the same conclusion with respect to "selection" that we have reached with reference to the cognate ideas —"fit" and "struggle for existence." It is found in the ethical process as it is in the cosmic, and it operates in the same way. So far as conditions have changed, so far as the environment is indefinitely more complex, wider, and more variable, so far of necessity and as a biological and cosmic matter, not merely an ethical one, the functions selected differ.

There are no doubt sufficiently profound distinctions between the ethical process and the cosmic process as it existed prior to man and to the formation of human society. So far as I know, however, all of these differences are summed up in the fact that the process and the forces bound up with the cosmic have come to consciousness in man. That which was instinct in the animal is conscious impulse in man. That which was "tendency to vary" in the animal is conscious foresight in man. That which was unconscious adaptation and survival in the animal, taking place by the "cut and try" method until it worked itself out, is with man conscious deliberation and experimentation. That this

transfer from unconsciousness to consciousness has immense importance, need hardly be argued. It is enough to say that it means the whole distinction of the moral from the unmoral. We have, however, no reason to suppose that the cosmic process has become arrested or that some new force has supervened to struggle against the cosmic. Some theologians and moralists, to be sure, welcomed Huxley's apparent return to the idea of a dualism between the cosmic and the ethical as likely to inure favorably to the spiritual life. But I question whether the spiritual life does not get its surest and most ample guarantees when it is learned that the laws and conditions of righteousness are implicated in the working processes of the universe; when it is found that man in his conscious struggles, in his doubts, temptations, and defeats, in his aspirations and successes, is moved on and buoyed up by the forces which have developed nature; and that in this moral struggle he acts not as a mere individual but as an organ in maintaining and carrying forward the universal process.

JOHN DEWEY.

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"LEBENSLUST."

JOY is the sunshine of the soul. And like all other sunshine it is both a chief cause of growth and a most powerful antiseptic, a staunch friend of life and a deadly enemy of fungi, miasms, and decay generally. And yet men have hidden themselves from it in caves and dark places of the earth as if it were a pestilence. Yes, and are still hiding. By one of those curious errors of indirection so common in human experience the mere fact of pleasure being so inherently and strikingly attractive made men hesitate to openly avow it as an aim or object. In the first place, it was altogether too childish to say that you did a thing simply because you liked to do it, or wanted something merely because it would give you pleasure. It might be perfectly true, but one must formally give some more "grown-up" reason than that. In the second place, the pursuit of joy carried to extremes becomes hurtful, *therefore*—with that charming logic which has been so brayed into our ears in these "prohibition" days,—joy is not to be pursued at all,—officially. Fortunately the actual practice of the race has been far different. Hence most creeds and systems of morality or other guides of conduct have felt called upon to solemnly warn humanity against pleasure of all kinds, sometimes even against woman as the chief means thereof, apparently in the philosophic hope that by vehemently insisting that the race shall go ten miles against its instincts, it may possibly be (actually) got to go the one mile which is really desired. But this line of action, though well-meant and perhaps fairly effective, has one serious defect. It places so large a part of the joy-seeking activities of mankind completely outside of the pale of its sanction, that these come to be regarded as sinful

in themselves, to be indulged in only with an air of sneaking apology and regarded as mere, at best evil but necessary concessions to the "animal part" of man's nature. Hence when a man "plunges into pleasure" he usually leaves his reason and his sense of moral discrimination behind him; there is no such thing as a righteous, moderate indulgence, it's all wrong, and the only question is, how much can he stand without injuring his constitution or his business reputation. Consequently nearly all of the avowed pleasure-seeking which one sees is either idle luxuriousness or harmful dissipation, and a certain sort of stigma comes to attach to any one who ventures to advocate enjoyment as a legitimate aim of human conduct. But even at the risk of being accused of favoring and perchance practising all sorts of improper things from selfish hedonism to "licentiousness," I must declare that the message of the Fifth Gospel is unmistakable upon this point.

It is not only perfectly legitimate but one of the most whole some and elevating aims which can be found. As an incentive to vigorous, healthy development, both moral and physical joy takes its place beside the other great motive impulses, Love, Courage, and Hunger. We have already seen what a valuable guide to conduct our natural instincts and the pleasure that attends their gratification are, not merely in the physical but also in the mental and moral realms. So that in the race generally and the child especially a very large part of our activities will be found to have joy as a motive. As a spring of human action the relation between it and pain or discomfort is most singular and often puzzling. Whether more actions are determined by the fear of pain or by the hope of joy would be a question worthy of the dialectic of the schoolmen. The question clears somewhat when we remember that pain and pleasure are simply opposite extremes of the same scale of sense-vibrations. Moreover, both being purely relative, the mere escape from or cessation of pain becomes a pleasure by contrast, and the deprivation of pleasure a pain. So that we may be striving to gain or retain pleasure and avoid pain in one and the same action and which most powerfully impels us would be a question for the gods to decide.

The relation between the two would perhaps be most nearly expressed figuratively by saying that pain is the stern monitor who drives us into the path of safety and well-being, while pleasure is the smiling guide who leads our steps along it. Gaunt Hunger may drive us to the board, but kindly appetite presides at it after it is spread. Pain may be the primary cause of the first performance of most of our vital functions, but their continuation and harmonious repetition is chiefly determined by pleasure. And yet the pleasure, appetite, is merely a mild and bearable degree of the pain, hunger,—which brings us to the conclusion that pleasure is the great complement and normal successor of pain, and that most actions determined originally by pain or the fear of it which do not become pleasurable by repetition are physically injurious and ethically immoral. So that joy becomes Nature's stamp of approval.

Duty, if determined by rational and wholesome ideals, ultimately becomes a pleasure, and healthful courses of action originally involving much effort from repulsion, whether didactic or industrial, become in the end pleasurable when formed into "good habits."

Most things which we like to do (all which we like by instinct) are beneficial to us, to a greater or less degree. From a biologic point of view could we imagine the existence of a species whose preferences and pleasurable instincts were on the side of harm? How long would such a species survive in the struggle for existence? Of course, this motive like any other must take its place in the parliament of impulses and submit to the vote of the majority. It has, however, full rights upon the floor, and the burden of proof is in every instance in its favor. The mere fact that we take pleasure in a thing or action is good presumptive evidence of its value. While pain, and a good deal of it, is absolutely necessary to vital progress, yet far the larger, and more frequent and constant part in this is played by joy. The value of pain emphatically lies in its avoidance and its developing effect upon the mechanisms to that end, and while up to a certain point beneficial, beyond that it becomes injurious and even disastrous. Long-continued submission to bodily pain from physical inability to escape or failure to relieve

undermines strength, destroys appetite and nutritive powers, deranges the nervous system, and retards recovery in a most serious manner. And so far from "purifying" and elevating the moral sense, it is much more apt to blunt or distort it, to ruin the temper and destroy self-control. The "great sufferer" makes a most pathetic and instructive appearance but like some other martyrs, in a majority of instances, does not improve upon closer acquaintance. She is apt to become selfish and exacting, and the chief credit that she is usually entitled to is that she is no worse under the circumstances.

So that we have every reason not merely for recognising pleasure as an aim but for trusting it as a guide, subject of course to revision by our other impulses and aims. Here as everywhere morality, sanity, consist in balance. The great advantage of this recognition is the powerful aid which it gives in making goodness positive and aggressive, instead of negative and defensive. Let it once be admitted that joy is righteous in itself and legitimate as an aim and a long step has been taken towards making righteousness joyful and duty a pleasure. The deplorable and disastrous attitude upon this point taken, for the most part by Christianity in general and by Puritanism in particular needs no extended notice here. It is sadly familiar to all of us both personally and historically and has been utterly condemned not merely by modern science, but by the common sense and healthy instincts of humanity in all the ages. It is not merely erroneous but profoundly immoral and with the very best of intentions has cast a deeper gloom over and brought well-nigh as much suffering upon the human race, as any of the vices it was intended to check. The gloomy pessimism of the gospels and epistles, as to the believer's prospects and hopes in this world, "They that will live godly in Christ Jesus shall suffer persecution." "For if in this life only we have hope, we are of all men most miserable," "In this world ye shall have tribulation only," "Woe unto you when all men speak well of you," "Mortify the flesh with the affections and lusts," and scores of similar jeremiads are bad enough, but they have been "bettered" by the Church in all ages since. The simplest statements have been distorted and even omis-

sions turned to account. We have been gravely informed that Jesus never smiled though he is recorded to have often wept, and "For every idle word that men shall speak they shall give an account in the day of judgment" has been interpreted to forbid jesting and light-hearted conversation of every description. There is no more saddening page of the history of mankind than that which records the results of stoning one of the greatest of the prophets of the Most High. From the denial of the holiness of joy, have come the essential meritoriousness of self-denial and suffering, the righteousness of gloom, the piety of self-deprivation and torture, the sanctity of dirt, the holiness of ignorance, and the whole dance of delirium and carnival of unreason which has at last died down, thank Heaven, to a few, feeble infantile prancings in strict evangelical circles around the pillory in which are exhibited those chief and most potent snares of the Evil One, dancing, cards, and the theatre. The merest reference to the facts is sufficient argument against the position, and indeed modern orthodoxy has at last recognised the error of it and modified its "interpretations" of scripture to meet rational views. Even from the innermost circle of the evangelicals comes the message, cheering both in its eminent good sense and frank, Saxon bluntness, "many Christians think themselves pious when they're only bilious." (Bishop Vincent.)

And yet in spite of this great object-lesson of the utter failure of reprobation and denunciation, a chorus of protests arises at once on every hand, the moment it is even suggested to officially recognise joy as an aim and pleasure as a guide in conduct. And this in spite also of the further fact that both biology and medicine have abundantly proved that three-fourths of the actions and things which give us pleasure tend to the advantage of both the individual and the race. The great dread seems to be that an era of licence, of self-indulgence will be thereby established at once. But a glance at this fear will show it to be really unfounded.

In the first place this change brings joy, as it were, from the outlaw of a despotism, to a citizen of a republic. Instead of being less amenable to law and reason than before, it is made more so. The mere recognition implies the presence of an element of reason

and utility which can be estimated and its legitimate weight and limits defind as accurately as that of any other righteous motive. Instead of regarding it as an impulse which *will inevitably* at times be yielded to without reason and in defiance of authority, its indulgence is freely granted, so far as it can defend itself on rational grounds. To use a somewhat changed metaphor, the robber-baron has become a member of Parliament.

Secondly any pursuit of joy carried to excess becomes a failure, judged solely from an esthetic standpoint, promptly defeats its own aims in fact.

Take a mere gastronomic indulgence and the pleasures of sweetness, and beyond very moderate limits, it promptly results primarily in blunting the tongue and clogging the palate to the verge of disgust, and secondarily in a colic or an attack of biliousness. The penalties of excess are much greater than the pleasures of indulgence. An enjoyment of minutes is matched by the discomfort of hours or even days, and from a purely hedonistic standpoint the balance is heavily upon the side of moderation. And in those cases in which discomfort is not actually induced, excessive indulgence soon blunts or even destroys the capacity for pleasure. In fact moderation and control are absolutely necessary to successful self-indulgence.

These of course are mere truisms, but it is really surprising into how highly moral a course of conduct, the intelligent pursuit of pleasure alone, with an eye to permanence and the many-sidedness of man's needs in this regard will lead us. Indeed several celebrated systems of morals have been based upon this impulse alone, under different names, from the epicureanism of early days to the "refined selfishness" of Bentham, and the "utility" of Spencer. Morality is not authoritative but essential, not artificial but natural and self-existent, and a large measure of it will be attained by the intelligent and effective conduct of life from any *natural* standpoint whatever, whether utilitarian or esthetic, instinctive or devotional, spiritual or material.

We are so apt to judge every impulse or tendency by its most striking results in other words by its extremes. The instant that a

"life of pleasure" is mentioned, the image, that involuntarily springs up in our minds, is that of the idler or the rake. And yet either of these judged by even the briefest "life" standard of pleasure alone, is a colossal failure. Pure idleness, though a delightful relief after arduous toil, whether bodily or mental, has the feeblest staying powers of any pleasure that can be mentioned, indeed it *is not a pleasure at all*, except by contrast. And the contrast fades out with wonderful rapidity. Enforced, beyond a few hours or days it becomes absolutely intolerable and the most excruciating torture which the wit of man can devise.

The moment a man succeeds in reaching the "leisure-class," he sets to work to get rid of his idleness almost as energetically as he did before to obtain the privilege of it. The nobler sort of the "upper classes," the real "aristocracy," of every land, whether hereditary or otherwise, take their duties and opportunities seriously and work just as hard and self-denying as any "laboring class" in the community, simply to make their lives tolerable to themselves. While the baser sort make just as much of a business of pleasure-hunting as any banker does of money-lending or farmer of stock-breeding, and *get not a whit more of pleasure out of it.* If they succeed in their "business," they enjoy life, but so does any man who succeeds in his occupation, no matter what it is, and the percentage of "bankruptcies" is high among them. Pleasure is like several other things in the world, the surest way not to get it is to aim directly and deliberately at it. As for the rake and the hard drinker, instead of getting the most pleasure out of life, no one with his equal opportunities gets less. There is a wild delight in sowing "wild oats" but a painful laboriousness about the reaping of them. And there is a "sure crop" and apt to "bring forth thirty-fold."

Considered as a pleasure-crop, they are a ghastly failure. We have the unanimous testimony to this effect not merely of the moralists, but of the rakes, the libertines, and the wine-bibbers themselves. And when these two classes of worthies agree, the point may be considered established. In the case of wine-drinking, for instance, leaving out of account its value as food and medicine and

considering it simply as a means of pleasure, the man who succeeds at it is not the guzzler, but the very moderate drinker. To say nothing of the "difference in the morning," the heavy drinker so quickly blunts his palate and drowns his finer senses, that bouquet, flavor, sparkle, play of color, vintage, etc., are utterly lost upon him. The poorest possible way to really enjoy wine or whiskey is to drink hard. The man who gets the most pleasure out of drinking, not only infinitely in the course of his life but even at the very moment of imbibing, is the man who drinks his Burgundy or Port by the glass and his whiskey by the ounce, and not the one who gulps his champagne by the bottle and his whiskey by the pint. No one gets less pleasure out of alcoholic beverages than the drunkard—except the total abstainer. Therefore they naturally unite in abusing wine and the moderate users thereof. Every natural joy-instinct, when it has attained a reasonable and legitimate gratification of itself, has fulfilled its function and promptly disappears, leaving its place to be filled by the attraction of the next need of the organism. No man ever got drunk by instinct. He has in the first place to "learn to like" the taste of all but the weakest liquors, and even then, after drinking a moderate amount, he is much more unpleasantly affected, in nine cases out of ten, by the fulness in his head, the thickness in his tongue, and the vagueness in his legs, than he is pleasantly affected by the taste of more whiskey. If men would always stop drinking just as soon as they ceased to enjoy the taste of their wine or whiskey, there would be much less drunkenness than at present. Indeed, the habitual drunkard can hardly be said to be urged on by real pleasure-impulses at all. Certainly not by any natural ones but by a morbid craving first for excitement and then for delirious self-forgetfulness.

One of the most frequent objections urged against pleasure as an aim is its extraordinary evanescence. In the famous lines of Burns:

> "Pleasures are like poppies spread,
> You seize the flower, its bloom is shed,
> Or like the snow-fall in the river,
> A moment white, then melts forever."

But as a matter of fact this is one of its chief advantages. They are so irresistibly attractive that if they did not promptly fade upon realisation, poor, weak humanity would be in great danger of being incessantly impelled in one direction to its ultimate undoing. But every instinctive pleasure is capable of "gratification" which extinguishes it completely, for the present at least, and leaves the field clear for attraction by the other needs of the organism. There will nearly always be found to be much that is artificial and unnatural in any craving which leads to excessive indulgence of any sort. Natural desires fade like the rose, in the very act of fruition. "The full soul loatheth the honeycomb,"—but unfortunately not always the wine-cup. Man's *natural* pleasure-impulses and desires, if followed as they present themselves in their turn and each one permitted to take precedence of the others, according as its need is greatest, would lead him extraordinarily close to the pathway of health, not only physically, as we have seen in the chapter upon Instinct, but morally also.

The most serious misjudgments of pleasure are, we believe, based chiefly upon an oversight and a misunderstanding, an oversight of the inherent manysidedness, one impulse taking the place of another so easily and frequently that no one can lead to excess. To employ an apparent paradox, man is literally saved from pleasure by pleasures. The misunderstanding arises from a lack of comprehension of the real nature of pleasure.

As to just what is the essential characteristic, which in all cases makes a sensation or action pleasurable, we are still entirely in the dark. We do not even know what invariable attribute distinguishes it from the painful, indeed by most of our modern psychologists this entire group of sensations are classed together in what is termed the "pleasure-pain" series. About all that we can say definitely is that both are due to variations in the intensity of stimuli and appear to be opposite ends of the same scale of vibrations. Hence, "Variety" is literally "the spice of life." Nor does there appear to be any constant relation between the intensity of the stimulus or the suddenness of its variation and its pleasurable or painful effect, except that violent stimuli and abrupt variations

seem to produce painful rather more often than pleasant sensation. Probably the nearest approach to a definition and distinction, and one which certainly applies in a very large percentage of cases is that of Marshall, that pleasure is the result of any stimulus the response to which is easy and adequate and draws only upon such energy as is already stored up in the organism. When the response to the stimulus is inadequate and difficult and draws, as it were, upon the energy needed for the very life of the tissues, then pain results. This rule will not apply, by any means, in all cases, but it will probably go further than any other characterisation that has been attempted.

And when we come to apply this definition in our discussion, the problem alters greatly. If pleasure includes not merely actions and responses which are generally easy and require the expenditure of but little energy, but also those involving the liberation of large amounts of energy, *providing this has already been stored up*, so to speak, then will the reproach of "lotos-eater" be removed at once. And this definition is strikingly true in practice. A life which is "all bed, beer, and skittles," as the old phrase goes, is by no means the ideal life of pleasure; on the contrary, the keenest and most lasting pleasures of life are those which result from the most strenuous exertions, the most patient and skilful generalship, and the assumption of the greatest possible risks. Men love success far more than ease and honorable risk than dishonorable safety.

To say that the intelligent pursuit of pleasure will inevitably or even usually land men in either the idiocy of idle luxury or the insanity of dissipation, is a foul slander upon humanity. The pleasure of merely plucking and eating ripe fruit however luscious, is tame and insipid beside the triumph of stalking the elk or bringing the wild-boar to bay. To roll along the level highway upon the softest and most luxurious of carriage-cushions, is not to be compared for a moment to the delight and exhilaration of a wild dash across country, risking, if needs be, limb and life at every fence and brook simply in order to "ride straight." I can conceive of no exhilaration more delightfully intense, outside of warfare, than that of the heaving bound beneath you of the thorough-bred hunter

as he rises to the six-foot hedge and you crane forward to see how wide the ditch on the other side may be. The hiss of the water along the half-buried gunwale of the reeling sloop, is a far sweeter music than the rippling of a thousand tiny wavelets upon the sandy beach, as you lie basking in the sun.

The thoroughly manly man enjoys not merely ease and luxury but also and far more, adventure, enterprise, danger, laborious work even. Ask any true sportsman and he will tell you that his real pleasure lies in the excitement, the strain and the tactics of the chase, not in the eating of the game. The hardest work of the world is done from sheer love of it, not from a sense of duty. And almost anything that a man can work vigorously at and with a fair measure of success, he will enjoy no matter what his feelings towards it when he began. We begin by working to earn a living and end by loving our work, if it be only respectable. There is a pleasure in doing whatever we do easily and well, no matter how unattractive it may be in itself. Hence most men really enjoy their occupations, no matter how hum-drum, and are very proud of the way they perform their daily tasks.

The attitude of most men and all animals toward their life-work is not that of a bitter and irksome struggle for the mere means of existence, but of vigorous and invigorating, joyous activity. The "curse of Adam" is an almost unmixed blessing. Vigorous and continued activity is not merely a stern necessity of existence, it is a means of progress and a source of constant enjoyment as well. The "struggle for existence" is severe, but it is joyous also, and successful until it is ended by the Great Rest-Bringer.

Life is long and full of action and color. Disease is short and death painless and instantaneous. "Weeping may endure for a night but joy cometh in the morning." Joy has as marked a preponderance over grief in the natural world, as good has over evil. Always excepting that part of it discovered and reported upon by that strangely-assorted pair of deponents, the modern realist with his filth-worship, and the ancient orthodox theologian with his devil-worship. No one sees more of the sorrowful side of life than the family physician. And yet no one will more unhesitatingly affirm,

that in ninety-nine cases out of a hundred, even after the most terrible destruction of limbs, of senses, of usefulness, after the crushing bereavement of those dearer than life itself, after a brief period the balance of life adjusts itself again in favor of, first, tolerability, then of joy. Not that the beam rises to the same angle as before, by any means, though it does this in a surprisingly large proportion, but that it does reach the level and a little more. No man who faces the situation bravely and works hard and honestly at the task which lies within his powers, need fear permanent unhappiness.

The edge of grief or disappointment is most mercifully dulled by the flight of time, the satisfaction which comes of honest work well-done, never fails. If there be anything of which both the physician and the Darwinist are firmly convinced, it is the wonderful adaptability of both the human and the animal organism. Given the bare possibility of existence which includes either the power of vigorous effective exertion, or of free communion with one's kind, and happiness will ultimately result in the vast majority of cases. The more closely and lovingly we study any class of animals or stratum of human society, and the more firmly we become convinced that happiness and not misery is the rule. And not by a bare majority either, but overwhelmingly. Life in all is a struggle, but it breeds a superb set of healthy, blameless appetites, the natural gratification of which is an abundant reward for every exertion. The very strenuousness of the struggle gives it an exhilaration as long as it is successful, and when it ceases to be so death comes swiftly and usually painlessly. And we must remember that in the lower animals there is practically almost no fear of death, in the human sense. It is doubtful whether they can even distinctly conceive of it and if they could, having never invented a theology, they would have little reason to dread it excessively.

The hunted animal flees *not* "for its life," for it is probably beyond its powers to imagine itself ceasing to exist, but to escape the pain which it believes the teeth or weapons of its pursuer may inflict, or very often in sheer, instinctive dread of his approach. "Despair" and surrender are alike unknown to it, and when it can

run no longer it turns to bay and dies fighting, probably feeling the fangs of its captors but little more than soldiers do the mortal wounds received in the thick of battle.

And I frankly confess that my own firm conviction is that a large proportion of the "wretchedness" and "unhappiness" of the world about us and below us, both human and animal, has been "read into" it unconsciously by our nobly-mistaken sympathy in our fellow beings. We should suffer both physically and mentally under such circumstances, and so must they.

In short, while as keenly alive as ever to wrong and suffering and as strenuous to right the one and relieve the other wherever he sees them, the Darwinist is in large measure freed from that crushing conception of the preponderance of suffering and disappointment in the life of the world, the *Weltschmerz* which exerts such a powerful influence over our views of life and destiny.

Nor does this joy of living fade or even waver in the face of death. "Life is short," the moralist warns us, but what of that? If it be brave, vigorous and joyous while it lasts, how could it be improved by being made longer? Death is simply the end of life, not its destruction or reversal and come soon or late it cannot rob us of a single joy experienced or undo a single triumph won. "The lily of a day" was the fairest thing the sun shone upon, and triumphed and will be remembered as such "e'en though it fall and die that night."

Life is short, but it is as long as we are; aye, and if we live to three-score and ten, as long as our desires. To know that it must end sometime need not in any way detract from our rational enjoyment of it while it lasts. So long as it continues it is good, and when it ceases, so do we, as individuals. The happiest life, if it had no prospect of ending, would become terribly monotonous. The only thing which could cast a permanent gloom over life would be the fear of its indefinite continuance.

The bucket brings up precisely a bucketful whether it be lowered into a hogshead or an ocean, once or a hundred times, and we get out of life precisely what we are able to contain and would get not a drop more if we lived to be a thousand. And we human

buckets are usually filled to the limit of our utmost possibilities before we are fifty, although we may keep on fondly imagining ourselves to be hogsheads. Unless our capacity could go on increasing indefinitely, which it obviously does not, we could get no more joy out of life in a thousand years than in seventy, except in the matter of memories. If such an increase could occur it would practically amount to the loss of our identity. And from the point of view of the effectiveness and progress of the race, we had much better do this by death and allow a new generation to take our place.

As for a future life in spheres celestial, we are simply in the Socratic attitude, that as we have not a scrap of ponderable evidence as to it's character or even existence we should be most irrational either to dread it or long for it.

We are fully content to

> "Live long and happy and in that thought die,
> Glad for what was."

Content to rest and to live in our memories, our descendants and our "works which do follow us," but otherwise unafraid of any awakening.

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AN ASPECT OF ATTENTION.

WE SUPPOSE that all parts of what we call the material world are connected, and in a multiplicity of ways. If any ordered set of connexions may be conceived under the notion of *system*, we may speak of the system of gravity, of the system of chemical action, the system of the conservation and transformation of force and so on—and these systems or connexions go on concomitantly in bodies without confusion or interference. Not only could things never be *known* except in relation to each other, but even from the point of view of gravity we seem forced to assume that nothing would be what it is, if it were not for all the rest. And from the implications of this admission, from many constraining analogies, and from innumerable facts of experience, we are convinced or persuaded that every material thing has further the capacity, developed or undeveloped, of being affected by, and re-acting to, every attribute or aspect of every other material thing. Look, for instance, at the phenomena of magnetic attraction; at the delicate differences of surface which correspond to differences of color and are perceptible to the trained and sensitive touch of the blind, at that wonderful correspondence between light-rays and colored surfaces, owing to which, if we eliminate, e. g., the yellow from a ray of white light, that mutilated ray falling on what we call a yellow surface, shows us not yellow but a shadow—at the recent development of photography, by which the skeleton of a living hand, or the compass enclosed in a wooden case can be accurately transferred to the surface of a photographic plate.

What can be said, or supposed, as to the psychical counterpart of this complex material connectedness of mind or minds as

finite, as conjoined with matter? It will be generally admitted that at that end of the scale of existence which in its psychical aspect is best known to us, we have mind intimately connected with what Locke calls "systems of matter fitly disposed"—can we draw the line anywhere between this, and the other end of the scale, and say "Here all psychical life ceases, and we come to the region in which (as far as the finite existences themselves go) there is *mere* matter?" Putting aside the difficulty of conceiving any matter as *mere* matter, this does not seem possible. We seem rather forced to some such conception as that of Leibnitz or of Lotze, according to which there is mind or *psyche* everywhere. If there is everywhere connexion of material elements and systems, and if all material elements have a psychical side or element or factor, then there is everywhere a thorough-going connexion between psychical elements. Each system from its own aspect or standpoint, so to speak, has its own connexions, material and psychical, some "systems" (e. g., those which we should call ideational) being primarily psychical—others (e. g., circulatory, chemical, gravitational) being primarily material. If we wish to investigate connexions in the region where the ideational connexions are primary, it is best to begin with the ideational aspect; at the other end of the scale, attention should rather be fixed in the first place upon the "material" aspect—this being better known to us in that region, as the other aspect is better known to us in the other region.

On the view here advocated, we suppose that there is no psychical change without material, no material change without psychical. The multiplicity of connexions that exist concomitantly in material things, sort themselves, so to say; phenomena of gravitation do not interfere with e. g. electrical or chemical phenomena; the enormous complexity is quite free from confusion. In certain material beings—that is, in organised bodies—we find besides all this, an obvious and specialised systematisation. This is not known through the "consciousness" of the being to which it belongs.

On the other hand, in the case of human consciousness, there are ideational systems which express the result of emphasis and selection in the region of conscious psychical life. At this end of

the scale, the *material* correspondent of the ordered ideational complexity is matter of inference—as, at the other end, is the *psychical* correspondent of that material complexity which itself is, to some extent, matter of observation.

If the elements of psychic activity and passivity, action and reaction, in human minds are (as Dr. Ward has, I think, made clear) attention (including volition) and feeling (pleasure and pain) —then, if there is, as has been assumed, a psychical continuity corresponding to the continuity in the material world, it must be *of the nature* of attention and feeling: and while, on the one hand, such phenomena as those of "double consciousness" help one to grasp and to admit the possibility, in connexion with conscious organisms, of some secondary consciousness (that the ordinary conscious self has no explicit knowledge of) on the other hand, the acceptance of such sub-conscious regions opens the way for an apparently plausible explanation of mental phenomena that are familiar and normal, and also of many that are abnormal and extraordinary.

My point is that admitting concomitance of psychical and material elements, a thorough-going connexion of (1) psychical and (2) material elements, and a systematised complexity of both orders of phenomena, it seems natural and indeed inevitable to suppose that, as in the material region, a multiplicity of connexions of different orders coexist in the same thing or creature, without interference or confusion, so in the psychical region, there coexist the psychical correspondents of these connexions. It is "attention" (in the widest sense) that keeps order (so to say) in the psychical region; and there are probably varying degrees of independence among corporeal functions and material systems—the one-ness of attention being that which on the psychical side, holds the systems together.

Of this "attention," however, that which goes to keep the functions of the lower systems in working order, is sub-conscious—since these systems are certainly not the subject of clear consciousness in normal human life, and it is not with them that the attention which we can ordinarily control is, in clear consciousness, con-

cerned. To sub-conscious ideas there must correspond sub-conscious attention—and I suppose that the difference between attention in the conscious and the sub-conscious regions is simply a difference of degree—attention in the sub-conscious department being of the same nature as the psychical activity which, in conscious life, we are accustomed to refer to by that name.

Possibly if we could know the consciousness of elementary animals, we should find in them psychical correspondents of physical processes—such as, e. g., those of circulation and assimilation—which are unknown to us, and a capacity of response which we do not possess, to powers and processes of physical nature. The unerring instinct of direction in bees and migratory birds, the memory of horses for a road once travelled, the way in which dogs and cats sometimes find their way by a fresh path to their old home, and other apparently still more mysterious endowments of sub-human creatures, may be explicable by possibilities of the distribution of attention which have ceased to be normally within the grasp of human beings.

In the *material* organism of such a creature as man, the connexion and "systems" are indefinitely numerous,—the whole is, we believe, subject to gravity, is chemical, is electrical,—there are the large systems of assimilation, of circulation, and so forth,—even the blood corpuscle is a complex and systematised thing, having its own peculiar function; and the steady imperceptible growth and renewal of the organism as a whole is a kind of summation of innumerable growths and renewals of minute elements, each of which seems to go of its own accord about its own work.

On the supposition that all these *material* elements, systems, and connexions have their *psychical counterparts*, a human being looked at from the *psychical* side must be regarded as correspondingly complex.

The various minor psychical systems may be regarded as his in a very real way, although not normally matter of consciousness to him; for they can never be directly known to any other conscious being, some of them seem on occasion to enter his region of ordinary consciousness, and there is perhaps little doubt that as

constituents of his "subconscious" region they determine importantly the whole character of his conscious life. Further, it must be supposed that all are related to the particular stock of attention attributable to him,—an excessive demand in the conscious region may upset some sub-conscious region,—e. g., violent exertion, mental or physical, may disorganise the digestive system, and therefore its psychical correspondents,—an unusual sub-conscious demand may affect the conscious region,—e. g., a person who is not very vigorous in health finds that, after eating food, his power of conscious attention is temporarily diminished.

On this view it appears that the whole world does in some degree affect every constituent of it,—the advantage of a human being over one of his elements consisting certainly in enormously greater grasp and complexity, and presumably also in greater clearness, in the possession of "self-consciousness," and in the capacity of having normally at command a certain fund of what may perhaps be called "free" attention,—meaning attention that may be applied now in one direction and now in another,—while in the various sub-conscious departments there is probably no normal surplus of attention, nothing beyond what is occupied in maintaining the sub-conscious systems.

The fundamental and primary "systems" of gravitational, chemical, electrical, magnetic connexions are, as far as our knowledge goes, not susceptible of disintegration, disturbance or modification: they seem a kind of permanent basis for all the rest; it is the ideational systems that seem most susceptible of change, and this is what might have been expected, seeing that they are for the most part established within the life-time of individuals. The systems which belong to organised bodies as such seem to hold an intermediate position, their tenacity being less than that of the primary systems, greater than that of the ideational ones.

Perhaps, if we may believe that there has been a chronological development from the primary to the organised, and thence to the ideational, it may be held that at each stage upwards there has been a fund of free attention available (the advance being thus to some extent analogous to what happens in sociological development

generally). Unless we suppose something of this sort, we seem reduced to the position that, at some point, the psychical element of attention suddenly emerges from non-psychical antecedents.

Even within the region of the ideational systems we find that numerous sets of connexions are consciously formed; and then, becoming automatic by repetition, fall into the region of sub-consciousness,—this happens, e. g., with the movements of walking, writing, speaking, playing on musical instruments, and so forth. Here a distinct consciousness of the various movements involved in the practice of the art has become difficult if not irrecoverable. It was perhaps only on condition of the movements becoming so, and thus setting attention free, that the acquisition of the skill was made possible.

Of that which is normally, though not all at one time, matter of clear consciousness to us, all but a fraction is at any given moment in the sub-conscious region. That this is so we explain by reference to the "narrowness of consciousness," which together with the multiplicity of ideas and presentations make selection and emphasis the indispensable conditions of our conscious life.

Although to all that is thus in sub-consciousness we must suppose correspondents in the material region, what exactly these are, in many cases it may not be easy to say. It is, however, undoubted that certain lesions and other injuries of various tissues and organs have a powerful influence upon psychical life,—whole "systems" may be abolished or distorted, as consequent or concomitant of physical changes. And there is no commoner experience than that different bodily conditions are connected with different psychical conditions. Bodily fatigue, hunger, cold, warmth, due nourishment, even mere difference of bodily attitude (as Lotze points out) carry with them important modifications of the psychical life. It is probable that explanation is to be sought in alterations in the distribution of attention. There have been curious cases of what is generally referred to as lapse of memory, in which patients after some shock, or bodily illness or injury, seem to have lost hold of most of the past events of their life, or (even sometimes from mere disuse) of some particular region,—it may be some system of con-

nexions, or the ideas traceable to some definite tract of time. I knew of a case where, as an apparent result of illness, initiated, I believe, by some mental shock or trouble, memory of all that had happened for the year past entirely went, coming back suddenly after some months. That what immediately preceded some great shock or change is in varying degrees irrecoverable in memory is a phenomenon of every-day occurrence. (Cf. all cases of concussion of the brain.) In another case known to me, a person of great intelligence suffering from nervous illness (spasmodic asthma) seemed to lose all sense of the lapse of time, and was unable to address letters or write cheques,—she was quite aware of these particular disabilities and apparently keen, clear-headed and intellectually capable in other respects. A curious circumstance in this case was, that the sufferer had been a person of extraordinary punctuality, and had all her life kept up a large correspondence, and been in the habit of managing her own business affairs, including the writing of cheques: punctuality amounting to fidgetiness was a kind of passion with her. In such a case as this, might it be surmised that the material elements concerned had been to some degree exhausted or disorganised by excessive stimulation? And if so, the psychical inability here might be due to the actual absence of a (material) condition necessary to the very existence of the (psychical) objects to be attended to. In the previous case the dislocation of attention seems to have been initially connected with bodily disorganisation.

In such cases the psychical changes may, it seems, be regarded as changes in the distribution of "attention," these being apparently concomitant with bodily modifications. It seems that the phenomena to which Prof. Wm. James refers as distinctive of *all* emotion, and which indisputably *are* present in some cases of emotion—i. e., the apparent antecedence of bodily to mental disturbance[1] may be very plausibly explained (psychically) by reference

[1] On this Professor James bases the view that emotion is a consequence, not the cause, of the bodily expression. "If," he says, "we fancy some strong emotion, and then try to abstract from our consciousness of it all the feelings of its bodily symptoms, we find we have nothing left behind." (*Principles of Psychology*, II., 451.)

to alteration in distribution of attention in the *sub-conscious* region. For the bodily phenomena referred to—palpitation, trembling, pallor, etc.,—have (as psychical concomitants) elements which are normally in the sub-conscious region, and these are presumably in close connexion (through previous association or otherwise) with other sub-conscious elements, which are the psychical correspondents of the bodily changes aroused by, e. g., the smoke of a house on fire, the roar of a wild beast, the scream of terror or distress, and so forth. I suppose the order of occurrence in such cases to be that, e. g., the smoke of the fire affects perhaps the organs of smell, and perhaps those of respiration—to these bodily effects there correspond certain psychical modifications in sub-consciousness, connected by association with other psychical phenomena which have as bodily correspondents, trembling, pallor, etc. Conscious terror, rationally based on the thought of the danger threatened, with its concomitants and results, is perhaps the final term in the series.

A person who is very sensitive to vitiated air, and has often been made faint by it, will faint at the very idea of not being able to get out of a crowded room—such a phenomenon seems explicable by a similar reference to sub-conscious connexions.

A very curious and interesting case of interdependence between sub-conscious states is recorded by W. Jerusalem, in his book *Die Urtheilsfunction*, where he relates of a German poet, that, having thought out and partly composed a play that he had planned (much of it while playing piano-forte duets with his mother), the completion of the play and the writing it out were hindered by his mother's death and a visit to Italy. When he returned to his drama, he found it impossible to recall the scenes and speeches he had worked out—every effort of recollection was in vain. At last it occurred to him to play over again the same duets, and as he was playing them, all the scenes and imagery he had thought of before, came back to his mind. (Cf., returning to the room, or place, where one had thought of something, in order the better to recall it to mind.)

It seems unavoidable in talking about such connexions to in-

clude under the one name *sub-conscious* both what must be supposed to be normally altogether in the sub-conscious region, e. g., cognition of the proximity of metals or poisons,—and what normally alternates between that and the region of consciousness—e. g., our knowledge of any subject with which we are acquainted,—as the linguistic knowledge of a classical scholar, the scientific knowledge of a botanist, or the every-day knowledge which is common to all of us, though not always present to any one. Stevenson describes in his *Vailima Letters* how he once found himself shaken and trembling without knowing why, and on reflexion became aware that something in the present environment strangely resembled scenes in which his youth had been passed. Here explanation seems possible by reference to sub-consciousness, and to the alteration in the distribution of attention due to the force with which the presented scene acted on sub-conscious connexions.

Again, one often *feels* a mistake before one clearly *sees* it; or one feels something to be delightful or objectionable before there is any clear consciousness at all of why and how it is so—what is for the moment too complex or too wanting in clearness to be grasped by the conscious intelligence, appeals to sub-conscious connexions.

May not one also find in such considerations a clue to the enormous force of early associations, custom, prejudice, "authority," and the extraordinary difficulty that is often felt in appreciating a strange doctrine or fresh point of view, or learning to see the error that lurks in a familiar theory?

Every learner probably knows what it is to understand some view or assertion so far that he cannot refuse to accept it, while yet some dissatisfaction remains because it does not seem to come home to him, as it were. Nothing in consciousness hinders, but sub-consciousness is not yet in harmony.[1]

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[1] This suggests the question whether there would be pain if it were not for sub-conscious connexions (connexions of sub-conscious systems), and the demand made by these upon the attention which seems normally under our own control. To "physical" pain there corresponds injury or disturbance of some bodily function or connexion. Is it possible that all feeling is due to the action of sub-conscious

It seems possible to regard "physical" pain as the effect in consciousness of some sub-conscious disturbance which causes a slipping away from, or losing hold on, relations with other things. Pain considerable in degree or amount seems always to entail an appreciable weakening of the hold on life, and life appears to be bound up with the due maintenance of sub-conscious systems and functions. When pain appears to be more intellectual in origin, to be primarily dependent on dislocations or disturbances of attention in the ideational region, an analogous explanation seems plausible. There are here conflicting claims on attention due to some kind of ideational want of organisation. Such may occur when there is intellectual contradiction or discrepancy, or a failure to understand, —or a conflict between duty and inclination, or between desire and fact. There is a disharmony causing distraction of *attention*. This view does something to explain the pleasure that goes with talent or general capacity—and perhaps the widespread love of power—also possibly to some extent the delight of discovering or inventing, together with men's ordinary unwillingness or slowness to accept new views, theories, or customs. (It also explains their acceptance when this is willing.) It is this bias that tends to make eccentricity and all divergence from established custom so unwelcome,—and similar considerations perhaps apply to cases in which, e. g., some particular form, or color, or flavor is disagreeable, it may be to the point of painfulness, apparently only because it is *strange*, and therefore at first productive of some nervous or other

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connexions? In some curious recorded cases of disordered nerves (?) we hear of a wretched sense of far-away-ness and unreality of perceived objects, in which it looks as if the painful feeling were psychically connected with disturbance of sub-conscious connexions. If it were possible to sweep away sub-conscious connexions leaving only clear consciousness—is it not probable that all feeling, interest, pleasure, and pain, would go too? Do sub-conscious connexions play a prominent part in connecting each one of us with the rest of the world? Is it possible that feeling, seems what in psychical life is most immediate and individual, is the expression to the feeling subject of connexions between him and other things?

We believe it reasonable to consider that inorganic substances are not susceptible of pleasure and pain—is this connected with the fact that there is no surplusage of the element which in them corresponds to attention, and no possibility of disharmony or dislocation, psychical or material, between the elements or systems which they comprise?

disturbance. There is probably a *degree* of strangeness which would disturb or even destroy health of body and of mind, or even life itself. May we find here some clue to the inexplicable terrors that seem to affect infants who have never in their own person experienced anything but the kindest and gentlest treatment? When a very young child screams with (apparently) fright at sight of some new face, or perhaps of its mother or nurse in a new bonnet, or wakes from sleep with every appearance of having been terrified, may it not be suffering from the disturbance produced by pure strangeness (of presentation or idea), and be merely feeling the .... "blank misgivings of a creature moving about in worlds not realised?" Perhaps also inherited associations, or sub-conscious disturbances may be sometimes to blame. I am reminded here of a case in which a descendant of a clergyman who had been rector of Chillingham, always if he had pleasant dreams imagined himself to be wandering through the beautiful woods and grounds of that place, which to him personally were not in any special way familiar or delightful. His theory was that they had been specially delightful and familiar to the child of this rector who was his own ancestor and that this explained the recurring dream. And it may be some felt disharmony or want of explanation (which when perceived causes a sense of disharmony) that drives men to the "restless cause-seeking" that comes with leisure of attention.

If the more fundamental sub-conscious systems bring us into specially near and immediate connexion with the rest of the world in some of its aspects, the extraordinary power of talent or genius in tracing out the truth in certain regions, and getting that grasp of real connexions which is necessary for great constructive achievements, may be due to an abnormal development of some sub-conscious department, conferring special power to penetrate a particular set of real connexions. The alleged frequent concomitance of mathematical and musical ability seems interesting here, the relation between music and mathematics being really so close and fundamental, though on the surface, and to most people, no two things could be more different and unconnected.

Is the suggestion absurd that with the fundamental and abso-

lutely unchangeable nature of quantitative relations—which like all others have psychical correspondents in sub-consciousness—there is connected the unique certainty and convincingness of mathematical truth to every one in as far as he can understand it,—in the whole region of normally sub-conscious life there can be nothing that conflicts with them.

Simply thinking about something often enables one to see more in it; and often after sleeping, or ceasing to consciously think of some difficulty, the difficulty seems to have cleared itself up,—it seems natural to explain such phenomena by sub-conscious psychical activity.

The literally killing grief which old people sometimes suffer from losing the companion of years, or from having to leave the cottage they have lived in perhaps all their life, may possibly be explained, I think, by reference to the disturbance caused in sub-conscious regions,—perhaps the "home-sickness" of the Swiss may be of a similar nature.

In æsthetic emotion again, reference to the psychical region of sub-conscious systems with their far-reaching external connexions, affords perhaps the best promise of something like an explanation. The influence of music, for example, in most cases where it has emotional effect, is not explicable by reference to the past or present conscious life of the individual affected,—but it is not difficult to believe that sub-conscious connexions with the sound, the rhythm, the movement, the feeling expressed in it, may stir the soul to its depths. A person may be intensely stirred by music, e. g., of Beethoven or Wagner, without having the faintest idea of what, in an intellectual sense, the music *means*,—but it quickens in him connexions deeper than ordinary consciousness, because it was the outcome and expression, in the composer, of a stirring of just those depths.

Can anything like an explanation of the phenomenon of sleep be suggested on these lines? It seems to me that it can,—that what occurs in sleep is a release of "attention" from objects that press upon it through sight, hearing, etc., and the systems with which these objects are most strongly connected; the "attention"

thus set free going to reinforce the sub-conscious psychical correspondents of corporeal processes of nutrition, renewal, etc. Any unusual demand on the part of corporeal functions or processes is liable to interfere with the movement of attention in the region of conscious ideation,—a great demand on attention, from the intellectual side, tends to be unfavorable to the best carrying on of bodily processes. Every one recognises, for instance, that immediately after dinner is not the best time for hard study,—and that unremitting mental application is liable to lower the condition of bodily health.

If at any time attention continues to be aroused by environing circumstances, sleep is impossible, and similarly if it has been riveted by intense absorption in some intellectual problem. Also, if there is some distinct organic disturbance, perhaps rising into consciousness, or some special demand on sub-conscious attention so great as presumably to hinder the general subsidence of attention to those regions in which the work of renewal and reintegration is carried on during healthy sleep, sleep is prevented or disturbed. The discomfort or pain of illness, for instance, or of indigestion, may hinder or spoil sleep. It must be some vitally necessary work that is carried on during sleep, and that cannot, it would seem, be carried on during the waking state, since—as is well known—nothing is so exhausting as continued sleeplessness—there is no substitute for sleep—though a person may do with less if he exerts himself less, and the strong can do with less sleep than the weak. Also it seems that in some cases, food can to a certain extent take the place of sleep and do its recuperative work. There is an account of some pedestrian travellers, who after suffering greatly from fatigue, tried the experiment of taking food every few hours. From this time forward their fatigue seemed to vanish. And probably most people have found that a slight meal has sometimes the effect of dissipating weariness, and re-inforcing the capacity to work. In children the tendency to sleep and the capacity to sleep may be due partly to the large demands made by growth—partly, especially in infants, to less sensitiveness towards external and ideational stimuli. People are often very sleepy after suffering great pain;

and after illness, also, or in great weakness, when we may suppose that there is much corporeal reintegration to be done, an abnormal amount of sleep is frequently required. (Cf. Mr. Durham's investigations.)

It seems as though the conscious life of man had reduced the sub-conscious life to subsist during waking hours with the minimum expenditure of attention and that this arrangement cannot be carried on without constant intermissions.

It has been questioned how far sleep is ever "dreamless." No doubt sleep is not always succeeded by any memory of dreams, and often when we awake, knowing that we have dreamed something, we are conscious that our dream is escaping us. Occasionally, when it seems on the point of being remembered, some outside disturbance—a noise, indicating some occurrence, which attracts our attention, a bell ringing or a clock striking which warns us that we must get up, or the arrival of some letter supposed to contain news which we are anxious to hear—puts it out of our head, and it becomes henceforth apparently irrecoverable. When we do not remember anything, we still probably have dreamt, in some fashion —either something not apprehensible or reproducible in our ordinary consciousness, or something not vivid or coherent enough to keep its place in memory, or something which is pushed out of consciousness when we awake by more powerful claimants for attention. It is thought that so-called "dreamless" sleep is best and most refreshing—in such sleep it is probable that there is the most complete release of attention from the "conscious" region which generally absorbs it,—illness, indigestion, bodily discomfort, intense stimulation of ideational centres, seem to cause much dreaming, often of a painful kind. In such dreams some terror of childish days may pursue one, all the intervening experience which has deprived it of power over waking life, being absent from recollection. It often happens that people who are somewhat overworked, or unduly excited by some intellectual interest, are haunted in dreams by that which has held their waking thoughts—possibly in some grotesque form—an examinee, for instance, dreams that he is a Latin Grammar, or that some one shows him "photographs of

young examinations." Some highly imaginative people dream long coherent stories which they can afterwards retail. Perhaps in this case sleep has been preceded by intense stimulation of certain ideational systems.

If the "dreamless" sleep is most healthful and restorative (possibly there is little doubt about this) the fact may be explained by the suggestion made above, that the function of sleep is to restore and re-integrate in sub-conscious regions, by temporarily reinforcing their stock of psychic energy. If the attention withdrawn from response to the external world hovers upon the confines of the ideational region, it must be, so far, hindered from carrying out the normal re-integration of sleep.

It is not merely in respect of its artificial origin that the sleep of hypnotism differs from natural sleep. In the hypnotic sleep, the attention detached from the environment is not left free to spend itself wholly in reinforcing the activity of some sub-conscious region, but is ordinarily attached to the hypnotiser in a manner which certainly seems mysterious, but is similar, in the view of Dr. Bernheim and others, to familiar cases of attraction and soothing,—such as where a mother sings and rocks her child to sleep—or perhaps where one person "manages" another according to the current phrase—or averts (or rouses) a storm of temper by steering clear of, (or leading up to) some dangerously exciting topic. It seems, however, probable that *some* reinforcing of regions generally sub-conscious is a normal feature in hypnotic sleep. Such a supposition affords a more or less plausible explanation of certain hyperæsthesias observed in mesmerised patients—e. g., sensitiveness to the neighborhood of metals or poisons, the influence of the magnet, the different effect of upward and downward passes.

The inexplicable and violent *repulsions* that some people feel towards certain animals is due perhaps to some similar but more permanent distortion of attention, and intensification of ordinary obscure connexions. The curious limitations of "consciousness" in some cases at least, of hypnotic trance, may perhaps be partially explained by considering that the attention which has not subsided into the sub-conscious region is directed by the hypnotiser to only

a certain number of objects, and it is consequently only the systems to which these objects belong that enter into his trance-consciousness. It is probable that in all cases of change of consciousness—in dreams, hypnotic trance, "double consciousness," under the influence of anæsthetics, when carried away by some intense excitement or interest, or affected by some shock—the explanation of failure to remember, in the recovered normal condition, what happened in the abnormal state, is similar. There is presumably in all these cases a very important alteration of sub-conscious attention, and a very peculiar and limited direction of attention, in what for the time we call the conscious region—the abstraction of attention from the ordinary waking environment being no doubt an influential factor in determining the character of both the conscious and sub-conscious conditions. And when we consider how difference of mood (= ? difference of sub-conscious states) in ordinary waking life may affect intellection, how some persons seem mentally and morally transformed by a thunder-storm, how different surroundings, the presence of different persons, the reception of some distracting or delightful piece of news, may alter the whole face of the world for us—and remember that on waking from sleep or hypnotic trance, our senses and perceptions are re-assailed by the most familiar and powerful stimuli—it does not seem inexplicable that memory of the past state should fail, especially when the frequently strange, disjointed, and grotesque nature of the dream or trance "consciousness" is taken into account—even in waking life, it is often impossible to *grasp* in a first presentation—(and much more to *remember*) a novel series of combinations even when the elements are quite familiar (cf., also ordinary cases of forgetfulness). And in certain cases—as of hypnotism or the influence of anæsthetics—where failure of connexion between the sleeping and waking is sudden and of the nature of a shock, shock on the psychical side being probably a sudden and considerable alteration or dislocation of the distribution of attention. In some cases certainly, where hypnotism or anæsthetics have been applied, the patient has when awaked a memory of conscious states which occupied his mind during "unconsciousness"—a hypnotised person, e. g., remembers what he

did and how he felt in obeying the orders of the hypnotiser, whom he was quite unable to resist—a patient under the influence of an anæsthetic for about thirty seconds by the clock and quite "unconscious" (as far as recollection goes) of the pain of an operation, remembers living through a lifetime of vivid and connected events during that portion of an ordinary minute—in such cases the trance may be comparatively weak, or the remembered consciousness unusually strong—or unusually analogous to the ideation of waking life.

A medical opinion has been recently expressed (I do not know how far it is generally held) to the effect that in operations under anæsthetics there is always, *somewhere, some* consciousnesss of what has happened. This is, I believe, supposed to be evidenced by, e. g., the expression of pain sometimes observed on the face of the patient before returning to normal life—perhaps also by the cries uttered during "unconsciousness" by patients who afterwards have no recollection of having *suffered pain* or *uttered cries*—the manifestations during "unconsciousness" are supposed to differ according to the completeness of the anæsthesia, and in some cases it has been recorded that the patient, though not feeling pain, had normal consciousness (retained in waking memory) of all the circumstances of an operation, e. g., in tooth-drawing.

A very curious case was mentioned (in a recent publication of the Society for Psychical Research) of a patient who underwent some operation under an anæsthetic and awoke unconscious of anything that had happened; but a few days afterwards, in a fit of neuralgic pain, recalled the minutiæ of the operation—her account when detailed to the surgeon being found to correspond precisely with what had happened.

The undoubted variations of relation between trance-consciousness (however induced) and normal waking consciousness may be explicable by many circumstances—the depth of the sleep, trance, or "unconsciousness," and the consequent dissimilarity of its psychical state to the psychical state of normal consciousness being no doubt an important consideration. But it cannot, I think, be supposed, that the trance-consciousness during operations, etc.,

is always a painful one—if it is so in some cases, it is probably, as above suggested, where attention has not been thoroughly dislodged from the region of ordinary consciousness.

It is said that sometimes in battle frightful wounds are inflicted of which the injured man is, for the time, totally unconscious—owing, no doubt, to the intense pre-occupation of attention—this pre-occupation having the effect of an anæsthetic in precluding both pain and the consciousness of being wounded—(though the *direction* of the abstracted attention differs enormously in the two instances). It would be interesting to know if in such a case subsequent remembrance or reproduction of consciousness of receiving the wound, or of the normally accompanying pain, would be possible. Many of us have probably had slight experiences similar in kind to that of the unconscious wounded soldier, though differing enormously in degree. The pain of toothache, e. g., may vanish from consciousness if one is very much interested, surprised, or frightened, and return with unabated force when the temporary distraction has passed.

It is perhaps not an uncommon occurrence for a very timid patient whom only the compulsion of violent aching has driven to the dentist's door, to discover, on arriving there, that the pain has ceased—for the time. In a similar way strong interest or excitement can triumph temporarily over severe fatigue.

We find, in cases like these, confirmation of Dr. Ward's suggestion that with consciousness of pain there is enforced direction of attention to some object in consciousness. But such cases also suggest that it is not *all* objects constrained attention to which causes pain, for the wounded soldier who is unconscious of his wound and in whom it produces no pain, owes that very unconsciousness to an overpowering attraction of attention in another direction.

Where there is severe pain, however,—indeed as long as there is pain at all,—the attention is forcibly held; pain thus hinders the free movement of attention, and the sufferer cannot attend to other things as he would if the pain were absent. Extreme fatigue (and even in a less degree extreme absorption, though not painful)

will also make it impossible to really attend to or care about anything—the weakness of ill-health and the weariness of over-work, may alike produce a kind of callousness that is real as well as apparent, for the time, but that can be reduced or removed by rest, or improvement in health. In such cases of insensibility, there is probably an intense demand, from sub-conscious regions, on the stock of attention at the command of the psychical *organism*.

Alterations of consciousness in abnormal cases, and as between hypnotic and waking states, and also cases so-called of double personality or multiple consciousness, seem generally explicable by reference to dislocations of attention in psychical regions, conscious and sub-conscious taken in connexion with physical modifications. No doubt such physical modifications accompany every conscious or sub-conscious psychical change—one could not be without the other—but in cases of definite bodily disease, what is "physical" seems to take the initiative, while in other cases the reverse holds.

Not to speak of the ordinary alternation between sleeping and waking, all of us have experiences analogous to these changes which in their extreme manifestations seem at first so strange—people who are subject to moods, or specially sensitive to certain influences, or who have felt any strong emotion of anger, fright, joy, regret, pride, or suffered from illness or anxiety, or cold or hunger or disappointment, or sudden relief of mind, know what it is to be a "different creature" at different times. Some explanation of why a hypnotised person sees or feels what he is told to see or feel, has been suggested above—analogous small cases sometimes happen in ordinary waking life. One thinks, for instance, that the window is open, and feels cold or detects a draught—it proves on examination to be shut, and then one concludes that the draught was only fancy.

The case of double consciousness may seem at first even more remote from normal experience, but certain somewhat similar phenomena seem very common. We normally see, taste, and touch at the same time—we walk and talk, or whistle and work, or count the clock and go on reading all the same—or write a letter, or play

on the piano, and carry on (a sort of) conversation, or knit and read out and at the same time think about something quite different to book or knitting. It is, I believe, a very common experience to read aloud or copy out in writing and not have any clear idea when we have finished of the general meaning (or even of a single sentence) of what we have read or written—and this the more as we have been the more careful to read distinctly or copy neatly and accurately.

What we have done cannot "be put to the account of thought," and yet without doubt the movement of our muscles and vocal chords had their psychical correspondents. In such cases the force of the established connexion between the successively present visual stimuli and the resulting movements of speech and writing counts for much. Somewhat similar are certain phenomena of what is called absent-mindedness. The cases that are retailed are mostly marked by some curious incongruity between simultaneous actions, or between action and circumstance. Take, for instance, the case of the old gentleman who, while pouring cream into his own cup, cried "Stop, stop"! feeling that enough had been added for his taste, but failing to realise that it was his own action that was increasing the superfluity. Of the same person it is recorded that once tapping on the table, as he had a habit of doing, his ear was struck by the sound, and he called out "Come in, come in! Why don't you come in"? not noticing that the tapping was due to the movement of his own fingers. I have known a person arrive at home after a day's shopping with an umbrella in each hand, and not the faintest idea of how, or when, one of them was annexed.

That a hypnotised person if ordered *not* to see a given object among others, should always seem to miss seeing it, has perhaps some parallel in the simple experience of looking over proofs with some special and narrow aim in view, e. g., that of correcting misprints, or revising the quotations in some foreign language, or of looking through a letter or exercise to see if the spelling is right, which one may do with an almost total absence of attention to any other point. Similarly, in bagatelle, one refrains from playing the black ball, or the "enemy's" balls at croquet, whatever position

they may, at a given moment, happen to occupy. In playing in the key of, e. g., F major, one automatically omits the white note whenever B is to be played (on the piano) and strikes a black one instead. How the object to be avoided is *recognised* by the hypnotised person may perhaps be explicable only by reference to supposed sub-conscious processes.

It seems quite possible that a knowledge of the past experiences of a person hypnotised or otherwise put into a trance (and even perhaps of the hypnotiser) might in some cases throw light upon the trance manifestations. Some very imaginative and nervous people have, I believe, the habit of living to a large extent in a region of fanciful constructions—they "tell themselves stories" and occasionally carry on the adventures of a given hero or heroine, month after month and year after year, at various intervals—very probably identifying themselves with some of their characters. This habit is sometimes carried on from youth to middle age.

It is possible that in such a subject, when entranced or hypnotised, the attention, displaced from its normal region, may be to some extent attracted to this fanciful familiar "system"—especially if some of the physical and psychical features of the trance-condition could be supposed similar to those ordinarily accompanying the flights of imagination. Abstraction from attention to the ordinary environment would certainly be one point in common.

(Perhaps the extraordinarily rapid succession of ideas which sometimes occur in dream, trance, etc., may be partly due to absence of the hindrances and demands due to purposes, external stimuli, etc.)

It seems possible that the reckoning of time which apparently takes place with astonishing accuracy in hypnotic subjects may be partly due to sub-conscious connexions with ordinary indications of the flight of time or the arrival of a particular date. Differences of bodily processes and conditions, differences of sounds indoors and out, difference of temperature and atmosphere, the general differences between night and day and seasons, the knowledge one has, often without conscious computation of the day of the week and of the month, have sub-conscious connexions, and may all have an important influence in directing the patient to the pre-ordained date and hour.

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REGRESSIVE PHENOMENA IN EVOLUTION.[1]

THE most paradoxical part of my theory of genius and its psychopathic basis is at once supplemented and confirmed by observing the contradictory phases of natural evolution, that all progress is based upon regress, that every evolutionary movement is based upon a regressive movement, that every new organ or degree of perfection acquired by an animal is formed at the expense of other organs in which progress has provoked a partial or total atrophy. The vertebrates, for instance, gain their greater individual power of defense at the expense of a diminution of their progeny. The superior animals and plants lose in adaptability what they gain in evolution, so that while inferior species may await indefinitely in lethargy the conditions favorable to their development without suffering from it, and withstand even for thousands of years a deficiency of air and water, or may even change their form and needs with a change in their environment (the *Mucor mucedo* for example which in the absence of oxygen transforms itself into a saccharomyces tube), the superior animals die on account of a few degrees of heat, dryness, or pressure more or less than the normal. The metazoans gain their increased differentiation at the expense of the almost eternal life which belongs to the protozoans, the only forms of life which possess the property of rejuvenation.[2] The

[1] Translated from the manuscript of Prof. Lombroso by I. W. Howerth of the University of Chicago.

[2] The protozoans in fact in addition to reproduction by gemmation and by division, have the property of rejuvenation. Two cells come into contact with each other, fuse, their macronuclei and micronuclei are exchanged and each is transformed into a new cell capable of regenerating itself *ad libitum*. *Vid.* Claus, *Zoologie*.

metameric species lose in their differentiation the power to reproduce themselves integrally if broken. Parasites pay for the high development of their reproductive apparatus with the loss of their nervous and digestive systems. Little by little as the animal becomes parasitical the alimentary canal is atrophied and the reproductive apparatus is developed. When the latter begins to function the alimentary canal is filled with cells which little by little destroy it and take its place in such a manner that by and by no trace of it is left.

So also it is at the expense of the tail and the gills, eaten up and digested by other cells, that in the tadpole the lungs and the extremities are formed; it is at the expense of the whole body, literally absorbed by the phagocytes, that during the chrysalis period the caterpillar is changed into the butterfly; it is at the expense of the legs that in the arthropoda the odoriferous glands, copulatory organs, ovipositors and gills, and in the gills flagelliform tentacles, and in the crustacea the swimming appendices and the reproductive apparatus, are formed.

Again it is with the loss of a set of wings that the diptera gain the balancers by which they guide themselves in flight, and it is with the loss of the chlorophyl, that is, of the power of assimilation, that the leaf gains its evolution into petals, stamens and pistils, into floating organs, and even into prehensory and digestive organs; and the loss goes so far beyond the transformation, i. e., it is so complete, that, as in the case of the *Lathræa squamaria*, the plant is no longer able to assimilate air and water, and would die of hunger like the animals if it had not the power of appropriating organic food. And man himself has lost an entire organ, viz., the tail, and many vertebræ, and his natural clothing of fur, in the acquisition of new cerebral convolutions and the abduction of the thumb, and he has lost also the limbic organ which so sharpens the sense of smell.

The white race in comparison with savages and many beasts has lost the sense of direction which even the smallest birds possess. And there are many facts which might be offered to show that with the invention of the alphabet and the development of

speech it has lost important faculties with which some peculiar public functionaries among the ancients, like prophets and magi, were endowed. And it is certainly true that the greater nervous intensity of the life of civilised man, and the greater conveniences of his life, are accompanied by a lesser acuteness of the senses, a weakened power of resisting external agents, a lesser invulnerability. And we of the nineteenth century pay for our greater analytic perfection acquired through the division of labor by the loss of our faculty of synthesis. We boast of surpassing our ancestors in morals, but we have lost their sense of hospitality, and their patriotic and religious altruism; and if we are not more cruel than barbarians we are able to contemplate their cruelty with indifference, as for example the massacre of the Armenians. And from time to time the infamies of Panama or the Roman Bank reveal to us even among our highest officials a corruption worthy of the Roman Empire.

What has been said of the animal species including man is illustrated in the history of nations, for we see peoples extraordinarily advanced in one direction presenting marked characteristics of regression. The Hebrews, for instance, followed Christ to communism, Moses to monotheism, realised some of the ideas of Marx in socialism, created exchange, formed the nucleus of the *bourgeois* capitalistic class, as now they stir up the fourth estate against it; present in fact indications of all the later results of evolution. And yet they adopted religiously the quippu (the alphabet with points) in their Talmud, used instruments of stone in circumcision, and in this latter custom preserved a relic of cannibalism. In political life they have always shown the two extremes of progress and conservatism. Having settled in a country for a time they preserved its customs, at least its manner of dress long after it had disappeared in the country from which they derived it.

England has developed the most liberal monarchy of Europe, has quietly put in practice the desiderata of the socialists, and yet it preserves the privileges of its lords who with its judges still wear the peruke and still use phrases peculiar to the time of the Normans. Beyond these superficial practices it has some deep-reach-

ing ones in its fetichism for the Bible, a book neither moral nor modern, and not always original; in its religious exaggeration going so far as to make Sunday idleness a sacred duty. Professing to be a positive and practical people the English maintain a system of division of measures and of money which is in opposition to all modern Europe, and which sometimes constitutes a considerable obstacle in commercial exchange and in scientific research.

The French who are distinguished in industry, in good taste, in fashions, in the arts and in letters, are yet in their excessive warlike passion, in their persecution of foreigners, in their veneration of academies and the nobility, in expecting everything from the government (which, however, they are continually reviling), in their preference of the word to the idea, but little removed from the Gauls. The Italians, superior to all in music, and to many in the sciences, the arts and letters, are still backward in economy, in social organisation, in industry, in commerce, and in true political liberty.

The fact moreover may be demonstrated experimentally. Feré (*Bulletin de la Société de Biologie*, 1896, p. 790) observes that when an egg is exposed to harmful vapors, or if there be injected into it substances soluble in albumen, or if it be subjected to a mechanical action, like placing it upon a table put in vibration by a diapason, the development of the embryo is arrested and a general retardation, or it may be a deformation or even a monstrosity, may be produced. However, it sometimes results in a development more advanced than would be expected from the time of incubation or in an embryo with one part deformed but as a whole more developed than the normal embryo which has not been so subjected.

It is known too that certain influences harmful to development if applied in a certain degree, are favorable when applied to a lesser extent. It appears then that agents capable of exerting an influence upon the development of an embryo resulting in arrest of growth, or deformation, may in the totality of development increase the growth, causing individuals to be produced absolutely superior and which present with partial defects a remarkable general constitution, while some individuals are created weak, deformed or ar-

rested in development. And so, he continues, the most civilised nations are distinguished by their number of exceptional beings, men of genius as well as the most depraved by vice and by intellectual perversion. If all these, he says, are variations and embryonic anomalies they should, however, be carefully distinguished from anomalies characterising degenerations which inevitably accompany evolution. The observation is confirmed by the fact that many regressive forms frequently bear signs of precocious evolution.

I have shown (*Uomo delinquente*, Vol. I.) that in criminals the wisdom tooth is frequently wanting, that the cranial capacity is often greater than the average, that there is a greater neofilia, all ultra-evolutionary characteristics, while they have the median occipital fossette, powerful jaws, and, a fact that is of more importance to us, a number of indications of atavism. Insane people and maniacs frequently present neofilia and great artistic activity, and idiots frequently display special aptitudes in which they become superior to normal men, some of them becoming true prodigies, as is shown by Dr. Peterson in the *Popular Science Monthly*, October, 1896, especially in arithmetical and musical ability, with a particular inclination to imitate in models, drawings, and pictures the objects which they have before them.

One of the most curious examples of this is "Blind Tom," a pure-blooded negro, born in Georgia in 1840. Born blind he showed no intelligence except for sounds. He could not speak a word, but he could repeat any sound which he heard. Merely by the aid of sound he could repeat Greek, Latin, German, and English texts however long after he had heard them recited, could play on the piano from memory any piece, however difficult to follow, and had learned by memory five hundred pieces of music.

Among cases of extraordinary memory in idiots Morel cites a cretin who remembered the date of the funerals of all the persons who had died in his parish within thirty-five years, with the names of those who had taken part in these funerals. Morel also cites the case of an idiot who could not count up to twenty, but who knew

the names of all the Saints in the Calendar with dates of their respective feasts.

As to the imitative faculty the most curious cases are cited. At the asylum of Earlwood there was an idiot who constructed a perfect model of a ship with all its more minute details. Geoffry Mind, a cretin who died in 1814, drew cats with so much skill that his drawings are preserved in all the leading museums of Europe. Gideon Buxton the famous lightning calculator who died in 1702 was stupid; and Zerah Colburn, exhibited at the age of six as a lightning calculator, could never learn anything. He had six toes and many characteristics of degeneracy. Dasah was absolutely a fool, and yet he could multiply mentally numbers of eight and ten figures. Zaneboni, of whom Ferrari and Guiccairdi recently spoke so acutely,[1] is very dull in everything that does not concern figures, has hardly any power of imagination and has very many characteristics of degeneracy, from which the learned doctors conclude that he is morally and mentally imbecile except in the matter of mental calculation.

I have already pointed out that precocity, as Ferrari and Guiccairdi also observed, and spontaneity are the specific characteristics of lightning calculators. And Ferrari justly notes that the memory in such persons is a primitive memory, purely sensorial and simple, by which a thing may be recalled and recognised with the greater part of its elements of fixation and with a clear aspect of the producing sensation without or with slight mental relation, while they are wanting in that secondary memory based upon representative association of sensorial objects, on account of which their imaginations are almost always visual. And among such the few who excel in their studies, like Gauss and Ampère, are lost. It is a question here of one-fourth genius to three-fourths imbecile.

From this to the normal degeneration of the genius the step is easy.[2] And it becomes necessary, almost fatally, that to the most highly developed form of genius should correspond a regression not

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[1] *Rivista di Freniatria.* Reggio, E., 1897.

[2] *L'Homme du Serie.* C. Lombroso, 2d ed. Paris, 1896.

only in other directions but also in the organ itself which is the seat of its evolution. And thus is explained the frequency of sclerosis, hydrocephalus, left-handedness, misoneism, pigmeism, moral insanity, paranoia, at the expense of which anomalies genius has been able to take root and develop.

CESARE LOMBROSO.

TURIN.

THE CAUSES OF INFECTIOUS DISEASE.

THE WISH "to know the cause of things" is as old as mankind itself. In medicine the scientific period dawned at the moment when the question as to the connexion of disease with environment was clearly propounded by Diodorus and by Hippocrates, "the father of medicine."

In former times men were generally satisfied, and they are frequently satisfied to-day, with the vaguest conceptions of things, conceptions based on the common ground of a search after animate causes or personifications. Universal knowledge is plainly unattainable in a given section of time; hence men have always been forced to piece out in imagination part of the lacking facts,—that is to theorise; and the form such speculation takes on is naturally in accordance with the measure of cultivation prevailing at the time. Even now, as is clearly shown by a glance at the conceptions of image-worship among educated and uneducated individuals and peoples, there is for wide strata of society an imperative necessity for personification, for animate cause. Men abandon the idea of such animate causes only after more profound thought and arrive first at a mechanical, then at a monistic conception of the universe. Guided by the pervasive, all-embracing law of the conservation of energy, the exact sciences have everywhere struggled through to a mechanical and in part even to a monistic standpoint. The extraordinary complexity of the phenomena which confront us in the consideration of the origin of disease doubtless accounts for the fact that up to this time no one of the conceptions in medical theory,—either the dominant ones or those in direct conflict with the ruling conceptions,—have been freed altogether from the

old mystical animism. For this very reason not only do scientific periodicals resound daily with the clash of antagonistic principles, but the conflict is continued in the daily press and even in the conversations on the street corners.

In the presence of the great pestilence which the Greeks before Troy ascribed to the arrows of the offended god Apollo, Homer makes the father of gods and men say:

"Lo, how men blame the gods! From us, they say, spring troubles. But, through their own perversity, and more than is their due, they meet with sorrow."

This notion that pestilences are punishments for sins, and that they can be combated by sacrifices, prayers, and pilgrimages survives to-day in the midst of civilised Europe, an example of the deep-rooted proclivity in untrained minds toward a search after the animate, toward ontological speculation. The convenience of this ontological conception has given to the bacteria, in pure mockery of all scientific thought, an opportunity to celebrate their resurrection as the true disease-entities. Now, indeed, every sewing-girl knows that these good-for-nothing bacteria are the cause of *Seuchen* —which is the good German name for infectious diseases. Given the specific germ and the supposition is that we know everything needful; methods of fighting the disease, of disinfection and of healing are mere unimportant details. We cannot enough scorn those older physicians who knew nothing about bacteria, but who could not bring it into harmony with their better philosophic schooling that these things should be suddenly presented to them in pure cultures and in beautifully colored microscopic preparations, as the *cause* of disease. But in truth a sound kernel lay in their criticism. It was in a kindred spirit that Liebig ridiculed Pasteur, remarking *à propos* of Pasteur's view that the yeasts were the cause of alcoholic fermentation, that one could not see causes. Physicians, however, were not embarrassed by such considerations and, under the influence of Koch's ingenious methods, it became a pastime to show the causes of disease in pure cultures; their amusement

[1] The passage in question occurs in the Odyssey I., 32–34.—*Trans.*

flourished even in the drawing-room, and the phraseology of the new game became popular everywhere

We shall probably best reach a scientific understanding of the significance of bacteria in the origination of disease if we consider briefly the chief ideas hitherto held concerning disease. The conception, now generally embraced, of a "specific" infectious disease presents itself first in the writings of the great English physician, Sydenham. By this term is understood a sharply defined characteristic malady which, in uncomplicated and "typical" cases, is clearly distinguishable in its course and symptoms from other diseases: measles, smallpox, scarlet fever, malaria, pneumonia, and cholera are such "specific" infectious diseases. It was precisely this individuality of the "typical" cases that pointed to an individuality of origin, and in exactly this general sense Sydenham first compared "species of disease" with species of plants. For this physician, therefore, the "specific" disease itself was an "entity," it was personified. To have done away with this conception is one of the great services of Lotze and Virchow, who recognised more clearly than their predecessors that disease, as well as normal life, is a process. A process, a mechanical or dynamical process, cannot, however, be a living entity; and hence Lotze and Virchow struck a fatal blow at the unscientific notion of a disease essence. Something in addition to their notion, however, dwelt in the conception of Sydenham, namely the observation that the "specific" disease must have a cause, although he did not separate sufficiently the conception of predisposition to disease from that of cause of disease. He recognised further that the character of the specific infectious disease varies greatly in different epidemics, and called this variation *genius epidemicus*, without remarking that the term expressed a fundamental departure from his conception of rigid disease types.

From the manifest opposition between Sydenham's conception of a "disease species" as an essence and Lotze, and Virchow's conception of disease as a process we are able at once to understand Virchow's direct and vigorous opposition to those bacteriologists who still stick fast in the fetters of ontology, and for whom disease-

producing bacteria are only mystical entities which they would like to set in the place of the older personifications of priestcraft to be worshipped by devout physicians and laity.

Virchow, following up the process of disease as far as possible, came at last upon the diseased cells. Here he too fell into a singular error. He set up the diseased cell as the essence of disease, thereby substituting another entity for the one he had just thrown down. It was a weak place in the cellular pathology and one against which Virchow's opponents were of course quick to set themselves, without, however, giving due consideration to one point in his theory, namely, that he did not lose sight of the disease process in his contemplation of the diseased cells as the microscopic disease entities. He rightly conjectured that the something that appeared as disease must be something that was already preformed in the normal organism. As the cause is essential to its effect, so the production of disease requires an inward predisposition. Lotze had already expressed himself in a similar way.

For the normal processes of life the same principle had been known for a long time through the investigations of the German physiologists Haller, Reil, and Johannes Müller. Whatever be the outside forces that act, the eye perceives only light, the ear only sound, the glands simply secrete, and the muscles contract. It is therefore the internal conditions of the organism, of its organs, tissues or cells, that alone determine the character of the effect. The impulse that must come from outside to produce these effects is called the stimulus. Hence there must exist fundamental internal organisation, that is to say, a predisposition to something external. Since also, while the character of the stimulus varies, the physiological manifestations remain the same, the true cause of the manifestations must lie in this internal organisation. The intrinsic predisposition is physiologically the true and sufficient cause, and therefore the sole cause of the normal processes of life. On this point Virchow indeed recognised, in agreement with Brown, that a quantitative excess in the normal life stimulus is the cause of disease; too much light, for example, produces blindness. The effect of a stimulus may likewise be too great if the natural predisposition

be feeble, although the stimulus itself is still within physiological limits for a normal organism. Disease, then, may be regarded as the result produced by quantitative changes in normal conditions, either when the physiological organisation is too feeble or the stimulus too intense. Apparently, at least, infectious diseases which were presumed to be entirely new qualitatively scarcely fitted into this conception. The doctrine of the causation of infectious diseases is accordingly not indebted to Virchow for its furtherance nearly so much as are other realms of pathology.

On the other side, those investigators who were dissatisfied with Virchow's explanation fell into the opposite error in their own investigations. The Viennese doctor Plenciz had expounded very clearly and more fully than any one had done before him the doctrine, that the cause of disease must be sought in the existence and activities of minute specific living things. Afterwards Eisenmann and still more acutely Henle set forth this parasitic theory of infectious diseases, which grew then steadily stronger through important discoveries. In our own time, through the work of Davaine, Pasteur, Klebs, F. Cohn, J. Schröter, and Koch, it has become the prevailing theory. By the statement of this theory Henle was thrown into just as sharp opposition to Virchow as Koch has been recently, and at the time was forced by Virchow's want of consideration into other lines of activity, a fact that enables us to understand many personalities in current controversy. The now well-established parasitic theory of disease asserts that every "specific" infectious disease is caused by a "specifically" characteristic small living thing or microbe. Most of these microbes—but not all—belong to the group of bacteria. These bacteria, which are therefore wholly external entities, are, as Koch has set forth with great clearness, the sole true and sufficient cause of the infectious diseases. Differences in these diseases are due to differences in the small living things at the bottom of the process, in the disease-producing bacteria alone. In short, bacteria constitute the "entities" of infectious disease. According to the *theatrum diabolorum*, the view prevailed in the Middle Ages that "every sin is under the control of and operated by a particular devil"; at present each disease in

similar fashion has its own devil in the form of a specific bacillus. Beelzebub, the god of invisible evil flies, is peculiarly the protecting patron of the "specific" bacteriologists.

Between this conception—in respect to which the French daily press owns allegiance to Pasteur and the German to Koch—and the conception of Virchow, there exists a profound antagonism. It is the same conflict that prevailed between Liebig and Pasteur over the physiology of fermentation. Liebig sought the cause of fermentation, as Virchow did that of disease, in the internal constitution of the fermentable substances, while Pasteur conceived the cause to be the external and visible yeast-cells. This conflict of opinion is now still further complicated by Pettenkofer's theory that at least for certain diseases, such as typhoid fever and cholera, the determining cause or essence is to be found in the external conditions which vary according to time and place. Here we have put forth as the true and sufficient causes of epidemic disease three wholly dissimilar things, upheld by three different schools, and which are treated as "entities" or personifications. Virchow sees an internal cause in the diseased cells, his opponents see an external cause in the germs that bring about disease, and Pettenkofer sees a cause in the external conditions which play no particular rôle either in the eyes of Virchow or in those of Virchow's opponents. At the same time, however, it must be said that Virchow consistently attempts to break free from the personification idea and to arrive at the comprehension of processes.

I shall now attempt to show what is false in each of these conceptions and what is scientifically tenable, and in so doing I shall point out that all these investigators recognised a part of the truth, but that no one of them attained to a comprehension of the whole continuity of causes in the sense of modern exact science. I hope also to show that the existing antagonisms resolve themselves into a higher unity by means of which the solution of the problem becomes again surprisingly simple, a result quite common in cases where each such antagonistic principle is unduly inflated that it may redound to the glory of its school.

CAUSES AND THEIR IDENTITY AND EQUIVALENCE WITH EFFECTS.

While the modern investigator in the exact sciences holds the conception of cause and effect only in a unitary or monistic way, and while in epistemology there is a similar understanding of these terms, among the people at large the word cause connotes quite different meanings. Sometimes the word is used in the same sense as it is by the man of science; such a case is the recognition in reference to an explosion that the degree of destruction is dependent upon the kind and quantity of the explosive material. Sometimes, however, we characterise as the cause the spark or the electric current which precedes the explosion and evokes it. In the first case the cause is something internal and exactly concurrent with the effect, in the second case the cause is something external which neither qualitatively nor quantitatively stands in any sort of congruent relation with the effect. In order to eliminate this double sense of the word "cause" and to make an end of the confusion, a general agreement was reached in connexion with the discovery of the law of the conservation of energy by R. Mayer and his successors, and this has usually been conformed to in epistemology also.

If potential energy or the capacity for doing work is transformed into kinetic energy or actual work the two are equal in quantity. They pass over quantitatively into one another, and the work as effect accurately corresponds to and is measured by the capacity for work as cause. The true and sufficient cause of any effect is always something internal, something that follows from the kind and amount of the initial energy, from its quality and quantity alone and entirely. This is the conception of a cause,—*Ursache*—, an idea which the German language can express so exceedingly well while other languages must paraphrase it (in Latin, e. g., *causa prima* or *princeps*, to which the further definition *causa interna* and *vera* or *sufficiens* are necessary for completeness) in order to represent everything that the prefix *Ur* denotes to a German. It is the absolute thing "that exists behind all change and remains primordially the same" as Helmholtz expressed it. This alone we

now call cause,—*Ursache*,—both in the exact sciences and in epistemology, and we accept nothing but that conception as true and sufficient. Only what is provided for in the cause both in quality and quantity can appear as effect, and everything that appears as effect already exists in quality and quantity in the cause, that is in the internal organisation.

RESISTANCES AND EXTERNAL CONDITIONS.

In a strict sense causes may pass over of themselves, freely and spontaneously, into their effect, as when a thrown or lifted weight immediately falls. In practice, as a rule, this does not happen, since in order to render a definite work possible, we prevent the raised weight from immediately falling again by hanging it up by a cord or by placing a support under it. Such a resistance to the immediate conversion of potential energy into work may be removed in a given case easily or with difficulty, and a corresponding application of external energy is necessary in order to do away with the resistance and so bring about the actual fall of the weight just at the right moment. This resistance, as compared with the actual conversion of the capacity for work into work, is in itself something purely adventitious; the conversion comes about now easily, now with difficulty, now in this way, now in that, according to the given external conditions. When uncertainty existed about the connexion, therefore, the expression "occasional causes" used to be employed. Such modifying conditions are not necessary to the effect, they have not in themselves the character of true causes but they are practically important. Corresponding to every form of potential energy there exist by virtue of the external conditions, definite initial circumstances and kinds of resistance which determine whether a given form of potential energy, a given possibility of work, a given internal cause can be converted easily or with difficulty or not at all into kinetic energy, into work, into effect. So long therefore as the external conditions remain the same, the same form of potential energy must be convertible with the same ease into kinetic energy, the cause into the effect. If the conditions change then the transformation may take place more easily or with more difficulty or not

at all, since by altering the conditions the nature and amount of the resistance may be changed. This quantitative conception of conditions was first set forth by me at the Naturalists' Meeting in Nuremberg in 1893, and Mach at the same time showed that the constancy of conditions is full of significance likewise for the constancy of physical processes.

THE LIBERATION OF ENERGY.

If the conversion of cause into effect, of potential energy into kinetic energy is prevented by any sort of resistance, such conversion can obviously take place only if this resistance is removed. This process may be called, with R. Mayer, the liberation of energy, and the external forces which accomplish this are called liberating impulses. I have shown that we cannot content ourselves with neglecting these liberating impulses as of minimal amount, but that they are connected in a definite and quantitative way with the liberation of energy; the impulse must always introduce energy enough to overcome the resistance.

All changes of one form of energy into another are visible or invisible movements, and the impulses that set free the energy are likewise transmissions of a movement. Because of the continuity of energy, therefore, every form of liberated energy acts by the transmission of movement so as to set free other forms of energy. In the processes of disease external signs of this process are afforded in the succession of changing symptoms. The impulses that set free energy are something external, and under certain conditions may be altogether lacking; it is therefore at least redundant to speak of liberating causes.

We now know of course that small causes produce not great, but only small effects, whereas small impulses, when of sufficient power to overcome resistances, may set free great effects. The effect is always a process, not an essence, and the causes which alone produce the effect are internal. External conditions and external impulses are always links of unequal value in an endless chain in which a movement exists. Breaking the chain at any one point makes the production of the effect impossible.

It is in itself a matter of complete indifference what notation one adopts. I have myself decided upon a definite and unambiguous terminology and thus reached clear-cut and definite conceptions. Such a terminology is applicable in all realms of human science, and therefore makes an end once for all of the loose terminology which has been in vogue in medicine. When I presented this view at the Naturalists' Meeting in 1893, the objection was made from various sources that, in view of the slightness of the theoretical knowledge and scientific training possessed by the majority of physicians, my exposition was somewhat too recondite. I have tried to succeed now in making it sufficiently clear that in the exact sciences there is absolutely no place for the toys of ontology, for entities or for essences, but that we must deal with dynamic phenomena, with processes which interlock with one another. That, I trust, is the plain sense of my detailed exposition.

I now hope also to show in a way intelligible to my readers that even in the organic kingdom and especially as regards the doctrine of the origination of infectious disease we have no place for the "entities" of Sydenham's "specific disease," or of Virchow's diseased cells, or of Pettenkofer's determining circumstances of time and place, or of Pasteur's, Klebs's, F. Cohn's, and Koch's "specific" disease-producing bacteria. I hope further to show that, in considering the origination of infectious disease and the dynamic processes which are concerned, we can take account of all these things without degenerating into the mysticism of ontology. Although Behring rates it as one of Koch's services that he established the entity of disease by setting forth the bacteria as the specific cause, yet it is clear that in adopting such a conception scientific medicine would take a long step backwards. In such a confusing state of affairs a clear and unambiguous terminology has always been an advantage. This, however, some of my opponents who are adherents of the bacteriological ontology, did not seem to appreciate, because it is advantageous for this exploded theory to have a vague, ambiguous nomenclature. This is plainly in order that the advocates may be able to say, after each newly-won position of science, that they had always really meant something quite

different from what every reader of their works had previously supposed them to mean.

ATOMIC COMBINATIONS AND RESISTANCES.

When organic substances are built up out of the elements or out of very simple compounds, there always results as the product of such a synthesis not only an increased number of atoms in the molecule but an increased number of combinations of atoms. But the individual atoms are more firmly bound to one another in the very simple molecules that serve as a starting-point than they are in the complicated synthetic products. Carbonic acid and water, out of which starch and sugar are formed in plants, are simple molecules and the atoms in the molecule are firmly united as compared with the more complicated and more unstable molecules of starch and sugar formed out of the same atoms. Carbonic acid, water, sulphuretted hydrogen, ammonia, and nitric acid, all of which may enter into the synthesis of proteid are very simple, stable atomic compounds compared with the loose and complicated combinations in which these same atoms are bound in the proteid molecules. Along with an increase in the number of atoms in the molecule not only the number of atom-groupings increases, but generally also the looseness of combination. Conversely also, if a complicated and unstable molecule be broken down and fall to pieces into simpler and more stable compounds, the ease with which the breaking-down is accomplished and the number of possible new combinations must be in general dependent upon the complexity of the demolished molecule. In a molecule built up out of simple compounds there exists just as much energy or internal cause as has been expended in its construction. The manner, also, in which the atoms are grouped or bound together produces a definite resistance which may be overcome with more or less difficulty.

In these cases, therefore, the resistance bears a much closer relation to the store of potential energy than in most cases in inorganic nature; it is a direct consequence of the process of construction and therefore a property of the molecular structure. In the

structure and constitution of an organic body the total amount of energy which may manifest itself as effect exists as the potential energy of combination, as the internal cause. The kind of energy is prefigured also in the molecular structure, and so, finally, is the kind and amount of resistance which prevents the immediate and free transformation of cause into effect. I have explained the latter phenomenon briefly, as it is unnecessary to consider details in this place. The looser and more manifold the atom-grouping of a molecule is, the more energy the molecule contains; so much the less also is the energy needed to overcome the resistance and liberate the energy of the molecule, and so many more are the different kinds of external impulses which are able, by the application of anisochronous movements, to overcome the resistance, to convert the potential energy into kinetic, the cause into effect.

In purely inorganic processes the liberating impulses either bring about an effect or do not bring it about according to the extent to which they are quantitatively adapted for the removal of resistance. This property of the liberating impulses bears a relation to the quality of the potential energy set free only through the particular form of motion involved. In the liberation of the energy of complex organic molecules, on the other hand, the impulses bear more of a qualitative relation. But whether they can or cannot make themselves felt in such a qualitative way again depends in the last instance exclusively upon the character of the molecular structure. The nature and amount of resistance depend also upon the structure, that is to say, upon the internal organisation of the organic substance upon which a liberating impulse impinges. Resistance is therefore in plain terms a result of adaptation, while in the inorganic realm it often results from the simple juxtaposition of different processes and their reciprocal action.

Accordingly, in our inquiry into the causes of organic processes we meet everything that we find in inorganic processes but better regulated and more intricate, in the first place by means of adaptation, and secondly, because of the complexity of the phenomena. We find various forms of potential energy or internal causes which may be transformed into kinetic energy, into work or

into effect. The effect, so far as its special features are concerned, depends solely upon the qualitative character of the compound, that is to say, the mode of union of the atoms in the molecule. This qualitative relation is more striking in the realm of the organic than in the inorganic, where it has been recognised from R. Mayer to Hertz that the qualitative relations may be overridden. At bottom, however, exactly the same subjective limits wall us in, although that is a fact that need not be dwelt upon here. Every quality is of course from one point of view a sort of sense-illusion or sense-limit, and not anything truly objective. We find forms of resistance, then, which result from characteristics of structure and therefore present not only the well-known quantitative but also a qualitative side worthy of consideration.

Finally we need to consider the liberating impulses which quantitatively and qualitatively serve to remove the resistance. We now depict the problem in a somewhat different way, because in the historical development of the subject the aspect of quality so predominated that the quantitative side was wholly overlooked or not recognised, and only Liebig, Lotze, Virchow, and Nägeli suspected the existence and partly recognised single factors of this kind.

The fact that a long time elapsed before, in the natural sciences, the dualistic contrast between organic and inorganic was abandoned is connected with the fact that the conceptions of the *Critique* so long lingered in men's minds. Kant was a dualist, and for him inorganic processes were the consequences of necessity; organic processes, of purposiveness. Schopenhauer found quantities in inorganic processes, qualities or stimuli in organic. Unfortunately dualism in the latter form still haunts the minds of many physicians who often never suspect its retrogressive character as compared with the mechanical and monistic point of view.

PREDISPOSITION TO DISEASE ACQUIRED AND INHERITED.

As the result of inheritance, individual development, and adaptation to existing conditions of life, every man,—and man is the subject I place from now on in the foreground,—possesses in his entire

organism, in his organs, tissues, cells, and body-fluids, at a given time and place, a definite kind and amount of potential energy or cause. This, when it becomes manifest, we designate variously as a physiological property or irritability, as a morbid susceptibility, as a predisposition to disease or as immunity. A predisposition to certain diseases exists among different races and species. Negroes for example are infected with smallpox much more easily than Europeans, while the latter sicken more easily with yellow-fever and the disease assumes in them a more fatal character. A varying susceptibility to disease is found among individuals of the same species, as is established by the fact that among our population only 3 to 7 per cent. contract cholera, the rest of the population resisting the disease. In spite of the ample opportunities of infection with tuberculosis which are afforded every one, only some 20 to 25 per cent. of the population really contract any form of the disease. Indeed, if we consider the most dreaded of all known infectious diseases, the Black Death of the Middle Ages, we are told that only one fourth of the whole population of Europe contracted the disease, some 75 per cent., therefore, being naturally protected, while it is reported that the small-pox in Central America destroyed one-half of the native inhabitants.

That the different organs of the body possess a varying predisposition to disease may be inferred from the fact that diseases which are now known to be infectious were once regarded as organic, as, for instance, inflammation of the lungs and catarrh of the intestine. The striking differences shown in the organs attacked by tuberculosis, and the selection of different organs at different periods of life beautifully illustrates this point. The experience of physicians and the vast material placed at our disposal in statistics of disease and death have, in short, shown the existence of a predisposition to disease and have made it clear that susceptibility to different diseases varies greatly according to the period of life and again according to sex.

Plant parasites furnish some fine examples of predisposition. *Laboulbenia muscæ* is found only in the house-fly. *Cordyceps*, on the other hand, occurs in the larvæ of different butterflies and other

insects. *Phytophtora infestans* occurs only upon potatoes, while *Phytophtora omnivora* attacks a number of other plants but not potatoes. Species of moulds of the genera *Pythium* and *Sclerotinia* attack only plants that are young and rich in water and therefore less resistant, but do not attack the older plants which are less rich in water. *Cystopus candidus*, according to De Bary, causes the white rust of the garden-cress (*Lepidium sativum*); in fact all plants are susceptible to the attack of this fungus, but only when they are in the cotyledon stage; when the cotyledon falls off the leaf becomes resistant and the spores and germ-tubes of *Cystopus* penetrate only locally in every case, without being able to penetrate far into the interior. The blister-rust of spruce needles occurs according to Cramer in its other parasitic forms only upon the leaves of the Alpine-rose and wild rosemary, *Chrysomyxa rhododendri* and *ledi*. In localities where these two plants do not occur no blister-rust is found upon the spruce. Similar relations exist, according to De Bary, between the rust of wheat and the Aecidia of the barberry. The "local" disposition is therefore, in reality, a disposition of the host. According to De Bary, if the disease predisposition due to the host be removed—e. g., if the barberry bush be banished to a distance—the disease disappears, and again arises when susceptible host-plants are introduced.

Perhaps the most remarkable fact in this connexion is that very definite predispositions may be acquired. An attack of the affections due to "catching cold" or of rheumatism—affections causally related perhaps—increases the tendency to those diseases, while an attack of any one of the more acute infectious diseases, such as smallpox, scarlet fever, or measles, confers immunity against another attack. Susceptibility to disease has become protection against it. Such an individually acquired immunity can be transmitted from mother to child. I shall not in this place broach the much mooted question, whether or not acquired characters can be inherited, and shall not try to set forth here how, upon the basis of my representation of the problem of causation, the question really comes within our reach. It may suffice at present to make clear that, under certain circumstances acquired characters, among which

may be reckoned acquired tendency to disease or acquired immunity, must be inherited. According to Kaltenbach, twin-sisters, originating from two different ova—double placenta from two chorria—were exposed in equal measure to infection from scarlet fever: one of them remained entirely immune, the other succumbed immediately. The latter resembled the father, the immune child the mother, who, fourteen months previously had experienced a severe attack of scarlet fever. Here was a pronounced inborn quality, but this quality was inherited and the character thus transmitted was acquired by disease. An interesting observation has been made in certain cases of twins and triplets. When, by infection of the mother with smallpox opportunity was given for placental, intrauterine infection of all the offspring, one or another of the children remained free from the disease, and the possibility of infection taking place by means of the placenta was proved by its occurrence in the case of one or more of the children. But it has also been observed that a pregnant woman who had been successfully vaccinated gave birth to a healthy child who nevertheless sickened three years later with smallpox, and in another case that smallpox was observed in a fœtus whose mother had previously suffered with the disease. Whether an acquired disposition is transmissible depends upon the kind and duration of the influence. On this point it is easy to deceive oneself. In Ehrlich's experiments upon rendering animals resistant to poisons, at first sight it seemed as if the young inherited immunity; another interpretation proved, however, to be the true one. The young of a non-resistant mother, when fed on the milk of an immunised mother, acquired immunity, thereby showing that the immunity was not conferred by inheritance. It was instead an instance of extra-uterine, individual immunisation by means of the protective substances contained in the milk of an immune mother or nurse. According to Tizzoni, however, immunity to tetanus acquired by the father can be transmitted to the offspring.

The existence of a definite predisposition to disease—as well as its opposite—is dependent upon inherited traits and upon adaptation to the conditions of existence, among which may be num-

bered not only soil, water, air, and the general relation of weather and climate, but also social conditions. These changing circumstances or external conditions act upon the internal disposition which remains always the same. If these conditions change, then adjustment must occur, that is, changes in the internal constitution must take place. Every change in locality, every considerable change in nutrition may, therefore, make itself felt upon our predisposition. By utilising the information gained from experiments in this line we have a means of influencing the disposition in our favor, or, for instance, by removal of social mal-adjustments, by improvement of the locality in which we dwell by changes in metabolism through introduction of better nutriment, or by regulating the temperature conditions of the body. Finally we are able to make use of the fact that in the act of undergoing a disease the predisposition to that disease is removed and converted into its opposite, immunity.

In no case can anything appear in the form of disease which was not previously present in the body as a predisposition; external forces are able merely to make this predisposition apparent. It is therefore at the outset important to hold fast to the fact that we are in a position to act upon a given disposition by a whole series of changes in external conditions; we can heighten it or remove it. Herein lies also the reconciliation of the physician's art, which has reference to the individual, with the official health regulations, which have regard to the conditions making for the betterment of all. When the physician, by thorough observation and investigation, knows the conditions that influence a given disposition in a definite way, when he is scientifically trained and has a true conception of hygiene and is at once physician and naturalist, then he is able to cure disease by use of the very same forces which serve to create or alter the human constitution. In this simple sense there is a true art of healing.

The external conditions to which a human being is subjected according to season and locality make themselves felt throughout the organs, tissues, and cells of the whole body. This they do through the mediation of metabolism and by the aid of the nervous

system, factors that determine the character of the synthesis or the building up of the organism, and as before mentioned, that determine also the kind and amount of the resistances to release of energy. We are accordingly set the further task of guiding the course of events by the use of those conditions that create resistances, and guiding them further in such a way that the physiological resistances are easily overcome, and the liberation of energy follows easily and in normal paths, while pathological resistances are avoided and the pathological setting-free of energy cannot result. Since the kind and amount of resistance met with in the organic kingdom is a consequence of organic structure, this task practically coincides with the first, namely that of influencing with the help of suitable external conditions the potential energy, the cause, in a word, the disposition of men.

DISEASE-STIMULI AND DISEASE-EXCITANTS.

The liberating impulses, as they are called in the inorganic sciences, are called stimuli in speaking of normal life-processes. Liebig, in treating of fermentation processes, first used the term excitation, so that we may speak of the stimuli that evoke disease as excitants of disease.

Through a depression of the physiological organisation and a consequent lowering of resistance, normal physiological stimuli may become disease stimuli, or, the organisation and resistance remaining the same, the normal stimulus may become more intense and be converted into a disease stimulus; in other words, the stimulus may come into play only quantitatively. If this be so, it is easy to understand how the kind of effect which we call disease depends qualitatively upon the kind of organ, tissue, or cell concerned, and indeed solely upon these and their internal adjustments (Virchow). If the disease stimulus, however, is a living thing, then, according to Koch's conception, the natural law should be summarily abolished and the quality of the disease stimulus, namely, the kind of disease-producing bacteria, should determine the disease, in other words, bring about the effect. We get only apparent support for this view from such facts as that anthrax bac-

teria always evoke anthrax, and tubercle bacilli tuberculosis in susceptible animals, and that many diseases, such as malaria and pneumonia, have a typical and often cyclical course. If the facts are considered attentively, they reveal a state of affairs really quite different. If we suppose that the pathogenic bacteria are "specific entities," that they are really the true and sufficient cause of disease as Pasteur and Koch have affirmed, then at least four conditions would have to be fulfilled. First, the disease-producing bacteria should exert no other effect than that of producing disease; second, their ability to produce disease should remain constant; third, they should affect all animals in the same way without reference to particular species; and fourth, they should produce only a single, sharply defined, typical and "specific" infectious disease. In such a way as this Koch has really pictured things to himself,—this is indeed the leading motive of his school,—while Pasteur who also originally looked upon the question in the same way, later adopted other opinions. The dogma of the "specificity" of the minute organisms that excite disease, the belief in the existence of pathogenetic or pathogenic bacteria, meaning thereby belief in unvarying specific character and physiological effect, was especially developed by Henle and later was worked out by Davaine, Pasteur, J. Schröter, F. Cohn, Klebs, and Koch. Other investigators, among whom I need name only Nägeli and Billroth as the leaders, have believed, in opposition to this view, that bacteria are constant neither in kind nor in action.

Now in the first place, are disease-producing bacteria capable of producing any other effect? By the modern method of pure cultures it has been established beyond all doubt that disease-producing bacteria do indeed display other activities; the successful culture of pathogenic bacteria is in itself a proof that those bacteria are not restricted to a parasitic existence and to the exciting of disease. Thus for example the bacteria of glanders develop a brown pigment upon potato; the cholera bacteria form a yellow or brown pigment upon potato, and in sugar solutions cause an acid fermentation; the so-called golden pus cocci, which are the most common pyogenic bacteria, form in cultures a splendid yellow pigment and

in sugar solutions produce acid. Whereas formerly, in accordance with F. Cohn's view, bacteria were distinguished according to their "specific" activities and characters into disease-producing or pathogenic, fermentation-causing or zymogenic, and pigment-forming or chromogenic, the foregoing examples show that a single bacterial species, a single "specific" minute living thing is capable of exercising all three of the specific activities formerly held to be essentially distinct. The "specific" bacteria are therefore not the true cause; that lies in the character of the nutrient medium; the bacteria can elicit only what is preformed in the structure of the medium. I have given the name of "cycle of activity" to this class of phenomena. They plainly militate against the doctrine of "specific" disease germs held by Cohn and Koch, and they help us to understand one important thing concerning the production of disease, namely that it is not the transferable "essence" that determines the character of the "specificity" of disease, but the similarity and the permanency of the conditions of life. Since disease germs, presumably "specific," are able also to cause fermentations and to form pigments, it is clear that a close relation exists between the "parasitic" bacteria occurring in living human beings and the so-called "saprophytic" bacteria, the bacteria of putrefaction, which are able to live outside of the human body upon dead, lifeless, organic or inorganic material. Such relations are sometimes very easily traced, but are often obscure and in other cases are wanting. The parasitic organisms may accordingly be separated into obligatory parasites, facultative saprophytes, and facultative parasites.

In the first class the relations to processes of putrefaction, and the ability to live at the cost and by the destruction of lifeless food material, have gradually been completely lost, or at least such relations have up to the present not been made out. In this group may belong perhaps the yet undiscovered germs of the so-called acute exanthemata like smallpox, scarlet fever and measles, and also the germ already discovered, in relapsing fever. The facultative saprophytes are those germs that we find as a rule living as parasites, but which, under special conditions, maintain themselves also

upon lifeless material, and by breaking down this lifeless nutrient substance are able to grow, multiply and perpetuate the species. The saprophytic condition has been brought about in the case of the tubercle bacillus by Koch and by Fischel, one of my pupils, and I was able to show that this organism, which up to that time had been called tubercle bacillus, is only a parasitic form of a pleomorphic microbe, the other forms of which make their appearance only in the course of its saprophytic existence and were hence entirely overlooked at first. The group of facultative parasites comprises those species which can maintain and reproduce themselves in a purely saprophytic way upon lifeless material without ever necessarily attacking living hosts as parasites; indeed to attain certain stages of development it is necessary that they should live the life of real saprophytes. To this group belong the majority of the disease-producing bacteria now known, such as the bacteria of anthrax, typhoid fever, and cholera.

Finally there are bacteria which in a strict sense never invade the living organism, but yet are dangerous and able to provoke disease. Many of the bacteria of putrefaction are able to generate out of lifeless nutrient substances poisons that act injuriously on human beings without the poison-forming bacteria themselves being directly involved. This may happen in the normal organism in intestinal putrefaction, a process which seems in itself to have become necessary as a result of adaptation. Such bacteria may be designated as œco parasites, and may be regarded as transition forms to the facultative parasites. The organism may also be affected through the removal of protective structures of the body by the action of putrefactive poisons, for example, the intestinal epithelium may be killed; these saprophytes may then enter into the dead tissues, and may even penetrate still farther into the body as for instance into the nearest lymph glands. The common bacterium of the large intestine, *B. coli communis*, can do this. There are found, furthermore, transition forms between the different groups of parasitic microbes, so that it is evident that we are not here dealing with rigid groups, but only with a division which enables us to

recognise more easily the characters important from a human standpoint.

In the process of putrefaction, a process which forms an absolutely necessary link in the cyclical course of matter, are found represented the fundamental phenomena of parasitism out of which by development and adaptation to living hosts the various stages of parasitism have arisen. Putrefaction may exert in other respects an important influence upon the excitation of disease; volatile or soluble poisons of putrefaction may weaken the living organism so that it can be attacked more easily and successfully by the true parasites or by their toxins. The simple vegetation of certain saprophytes acts in such a way that disease germs following in their wake can get lodgment upon man the more readily, while on the other hand other saprophytes may hinder the lodgment of pathogenic organisms. Among the various possible effects thus wrought by saprophytic microbes outside and inside a living host must be included those that either favor or hinder the lodgment and action of the disease germs. That is to say these microbes act upon the disposition towards disease. They present therefore only individual cases, albeit particularly difficult to estimate, of external relations or of conditions which may now exalt an existing disposition to disease, now diminish it or remove it altogether.

This explanation should make it no longer difficult for the reader to understand the very various modes of action of disease-germs in man, since these possibilities of action have developed out of two activities already manifested in the process of putrefaction, namely out of the formation of poisons by bacteria, and out of bacterial growth and multiplication. At one extreme, therefore, we find a kind of parasitic action in which not the bacteria themselves but the poisons formed by them and absorbed into the circulation are the more important factors, while upon the other side stand those parasites which act especially through the formation of local growths or tumors. To the latter class belong the germs causing tumors which have been investigated with especial accuracy among plants, and a well-known example of which is the germ of human tuberculosis; to the former belong the germs of diphthe-

ria and tetanus; cholera also approximates to the former group. Between these extremes stand the other pathogenic bacteria: in some the proliferation of the bacteria, in others their production of poison is the predominant factor. Disease producing bacteria may therefore affect man in very different ways. By growing and multiplying in vital organs they may cause changes, and by thus altering the metabolism of important organs may influence unfavorably the metabolism of the whole body; or they may rob the body of important nutrient material and introduce the products of their own metabolism into the body of their host; or they may, in the act of satisfying their own need of energy, split off from the proteids of the human body certain substances which act upon man as poisons; or they may themselves generate poisons in their own bodies and like poisonous plants, be in themselves poisonous. The mode of action may vary according to conditions; for example, ergot is a local growth for the grain, a poison for man.

In all cases, from the simple germs of putrefaction and the œco-parasites up to the obligatory parasites, one thing is a prerequisite to successful invasion, namely, that as compared with the mechanical or chemical attacking powers of the microbe the mechanical and chemical resisting powers of man be relatively feeble or impaired. If this is not the case the human organism either does not allow the germ to gain entrance to the body, or when entrance is effected it nullifies the poisonous action by a counteraction.

After what has now been stated no particular assurance is necessary that bacteria and other minute pathogenic organisms do not exercise their injurious effect upon man from an inbred wickedness and pleasure in doing mischief, but that in the phenomena of parasitism we have to do simply with questions of adaptation, with the utilisation of situations, so to speak, which man himself provides by his own sins of hygienic omission and commission, and which therefore he himself is able to remove. The germs of putrefaction dispose of the dead bodies of all organisms in nature, simply to satisfy their own need of energy and the conditions of their own metabolism. This is also the case when they adapt themselves

to the conditions of intestinal putrefaction. They may for the same reason invade the living organism whenever its normal protecting power has become enfeebled through errors in hygiene.

The second question is, Do the so-called "specific" disease germs vary in their capacity to produce disease? Buchner was the first to succeed, upon the basis of systematic experiments, in proving that the so-called anthrax bacilli can be influenced artificially in such a way that they can no longer bring about any illness, but behave like perfectly harmless saprophytes. The same discovery was soon afterwards made accidentally by Pasteur in regard to the bacteria of so-called chicken cholera, and we now know from hundreds of experiments that no peculiarity of disease-producing bacteria is more easily affected than the very capacity in question, commonly presumed to be "specific," of producing disease. The physician who seeks the "essence" of the disease in the "specificity" of the disease germs can plainly attach importance only to those parasites whose "specific" capacity of producing disease is invariable. The facts that demonstrate the variability of this capacity therefore obviate all need for seeking an "essence."

The third question is this: Do the same "specific" disease germs affect all animals with the same typical disease? This question must also be answered in the negative. We see that each kind of disease germ affects only certain hosts; syphilis, leprosy, cholera, and typhoid fever, are known only in man, while tuberculosis, glanders, and anthrax, attack both man and certain kinds of animals.

The fourth question is whether a "specific" disease germ causes only one disease. We may distinguish in this inquiry two groups of phenomena. In the first group belong those facts showing that similar symptoms may be evoked and that the same organs or tissues may suffer anatomically similar changes through the action of entirely different germs. For example, the formation of nodules or tubercles in connective tissue may be brought about by the germs of syphilis, leprosy, glanders, and tuberculosis; suppuration can be caused by the germs of wound erysipelas, the tubercle bacilli, the anthrax bacilli, and the germs of typhoid fever and

pneumonia; both the common bacteria of the colon and the cholera bacteria can incite diarrhœa; the bacteria of tuberculosis, of typhoid fever and pneumonia may produce inflammation of the pia mater; tubercle, typhoid, and pneumonia bacteria, gonococci, staphylococci, and streptococci, may cause endocarditis; the phenomena of blood-poisoning are caused by a whole series of bacteria. In these cases, therefore, the determining cause resides in the tissues and their disposition, not in the entirely distinct kinds of bacteria.

The second group of facts, belonging with these but obtained in another way, demonstrate that one and the same "specific" disease germ may produce very different affections. Diphtheria bacteria, for example, may occasion local diphtheria or paralysis or acute blood-poisoning; the bacteria of erysipelas may bring about erysipelas in the skin, but are able also to produce suppuration or inflammation of the lungs; the pneumonia germs may cause typical pneumonia, blood-poisoning, inflammation of the cerebral membranes, or inflammation and suppuration of the middle ear; tubercle bacilli excite tubercle formation in connective tissue, inflammation of the cerebral membranes, suppuration and true consumption or phthisis.

Perhaps still a third group might be added, comprising the critical diseases like intermittent fever, relapsing fever and pneumonia. Many observers suppose, in accord with Henle, that the germs of these diseases in man have a course of development sharply defined by hours or days, and that therefore the life-cycle of the germ determines the cycle of the disease. So far, however, as we know anything about these germs, we never find such remarkable cycles occurring outside of the human body. The pneumonia germs cause crises only in man, while in rabbits they bring about simple blood-poisoning without any cycle. In cultures they show no regular cyclical character at all. For these reasons I am inclined to seek the basis of such activity of a cyclical nature in peculiarities of the human organisation, and the more so that even in man pneumonia may sometimes occur without crisis and show a resemblance to forms of blood-poisoning.

Upon sifting all the available material, I cannot find a fact which is in real harmony with Koch's conception of "specific" disease-germs. I must protest also against the view held by Billroth and Naegeli, which is extreme and one-sided and I expressly acknowledge that we can distinguish species and genera among bacteria and other minute organisms. Such constancy as we observe, however, is not the mystical constancy of "specific" essences, but a constancy made possible by the permanence of the environment. The organisms change with the changes in their surroundings, and the placing of this fact on a sure footing constitutes the great advance that modern bacteriology has made beyond the standpoint reached by Koch.

Just as the human being possessed of a definite organisation is compelled continually to adapt himself to changing conditions of life, so is the microbe also constrained to the same task. In the majority of men the bodily constitution is always oscillating, manifesting now increase, now decrease of a definite disposition toward disease. The microbes also vary according to the conditions imposed upon them and display increased or decreased capacity to grow or form poisons in the human body, capacity in other words to remove with greater or less difficulty the resistance inherent in the human organisation.* Accordingly we observe the occurrence of both mild and severe epidemics, and in every epidemic, along with the "typical" cases, we find especially grave or especially light cases which do not conform to the schema.

If we diminish the disposition of a man toward a disease we influence his organisation in the sense of exalting its resistance to infection. In this way the same effect is produced as when we diminish the "contagious" or toxic quality of the disease germ, the disposition of the man to the disease remaining the same. The ordinary anthrax bacteria, for example, cause in guinea-pigs a generalised blood-poisoning which is speedily fatal, and in dogs, which are naturally immune towards this disease they cause at most an abscess, or a local suppuration. But if we diminish to a certain extent the disease-producing power of the anthrax bacilli, they pro-

voke in the otherwise very susceptible guinea-pig merely a local suppuration which readily heals.

The disease germs remaining the same, it is possible to heighten natural predisposition to disease by starving animals, or chilling them, or modifying their metabolism unfavorably by inducing artificial diabetes. In such cases animals succumb to the very disease germs against which when in a normal healthy condition they are immune. We know also that through hunger, insufficient nutriment, and disorders of metabolism such as diabetes, human beings are rendered more easily susceptible to infection than when in a sound and normal condition. Before the days of antiseptics the "healthy skin" played an important part in the progress of a wound.

The "specific" qualities of disease germs, qualities which they possess as do all living things adapted or adapting themselves to definite conditions of life, can only become manifest in the shape of a specific infectious disease when the forms of motion which they impart in order to overcome the resistances arising from the organisation of the human body happen to accord with the possibilities of motion which occur in the structure of man as the result of inheritance and adaptation. Only in this way is it possible to account for the fact that—as has been proved concerning some moulds—micro-organisms which, so far as we know, occur only as saprophytes upon dead material are able to produce disease when for the first time,—thus excluding any possibility of an adaptation,—they are artificially inoculated into susceptible animals.

If the facts are considered in a scientific spirit, rigorously and without prepossession, it is seen that the sum of the qualities of a disease germ is only apparently the "essence" of an infectious disease, that in reality, here as elsewere, a true internal cause is to be found, inherent in the internal organisation of man. Just as in all natural processes without exception, so here the disease germs act as liberating impulses and are able to set free only what in the form of a predisposition toward disease is in some way prefigured both in nature and amount in the human body.

The dependence of both resistance and disposition to disease

upon the conditions of life, as well as a like dependence of the disease germs upon their conditions of existence—inasmuch as they likewise are living organisms—explains, without recourse to violent assumptions, such facts as that insignificant local infectious diseases may become world-wide, as cholera has done in our own century, that new infectious diseases may make their appearance, as for instance cerebro-spinal meningitis in the last hundred years, and that diseases once widely spread like leprosy and the bubonic plague may dwindle almost to the vanishing-point. We can easily understand the fact also that everywhere, even under conditions originally very different, similar cultural influences arising from similar unsanitary social conditions lead everywhere to the same danger from diseases such as tuberculosis, for the reason that such conditions create a larger number of the same or similar dispositions towards disease.

That the "specificity" of the disease germs is a phenomenon of adaptation, and hence not an essence is manifest also from the fact that the parasites adapt themselves to given conditions of life not only in their mode of action but in their form. Koch has shown that the anthrax bacteria develop their characteristic form of rods only in their parasitic phase. The tubercle bacilli have such a strongly marked capacity of adaptation that Maffucci and Koch even distinguished as separate species or varieties the germs of mammalian tuberculosis. Fischel and Hueppe, however, by the choice of suitable parasitic and saprophytic conditions of life succeeded in converting the two kinds one into the other, and thus in proving that it is similarity or difference in conditions which ultimately brings about such great divergence.

Finally, in other cases of which more accurate studies were made long since, especially among the higher animal and plant parasites, a close adaptation to the conditions of life is manifested in the fact that a parasite, in order to complete its development, needs not only an interchange of parasitic and saprophytic modes of life, like the facultative parasites among bacteria, but requires a complete and more or less extensive alteration of generations. Such a parasite, in other words, attacks different animals and plants one

after another, in each of which it passes through a definite stage of development.

Among most parasites there occurs a free or saprophytic stage which is advantageous to the maintenance of the species. In such a case the parasite is often autœcious, that is, no change of host occurs. In alternation of generations there is always change of host or heterœcism, so that in the extreme cases of strongly obligatory parasitism this occurs in a fashion as if saprophytism were altogether omitted. In the tape-worm, for example, we know no free stage; the eggs pass into the outer world but do not develop (at least up to the present nothing of the sort is known). The scolex of *Tænia solium* is found in hogs, the tape-worm in man; the scolex of *Tænia mediocanellata* is found in cattle, the tape-worm belonging to it in man; the Echinococci are found in man, the respective tape-worm in dogs. The scolex of *Bothriocephalus latus* is found in predaceous fishes, and the tape-worm in man, but free living embryos arise from the eggs in water. In this latter case, therefore, a limited free stage does occur. In *Distomum hepaticum* three parasitic and two free stages are known.

We know that among the rusts or Uredineæ there occur upon grain summer spores or uredospores (stylospores) and winter spores or teleutospores; out of the latter are formed saprophytically in the fallen leaves a promycelium which develops sporidia; these get lodgment upon the barberry leaf in which the ædicia develop and form besides spermogonia, the so-called spermatia. We have therefore three to four parasitic forms and one free form. Among the smuts or Ustilagineæ the mycelium develops spore-bearing filaments upon the grain; out of these spores a promycelium with spiridia is formed saprophytically; the sporidia may invade young plants and so begin again the parasitic cycle, but they are able also to vegetate saprophytically for countless generations in a torula form. Here two saprophytic forms and one parasitic form are able to exist. The spores of most vegetable parasites are able to develop either a saprophytic form or another parasitic form.

An alternation of generations of this kind has not yet been demonstrated among disease-producing bacteria and other microbes,

but with some species its existence is not wholly improbable. It is obvious that such complications increase the difficulty of research, already arduous, but the fundamental facts that have been discussed are not thereby affected or in any way altered. The body of living organisms offers relatively constant conditions, and that explains why, in spite of the complexity due to an alternation of generations in several hosts, the parasites can remain relatively the same.

INFECTION AND CONTAGION.

I cannot conclude my examination into the causes of infectious disease without referring to still another feature of the external conditions which may be very important practically. Granting the existence of a given disposition toward disease, disease germs can evidently afford opportunity for the manifestation of this disposition only when they come in contact with it. That is the broad meaning of the word infection. From this point of view, accordingly, the unsuitable condition of the general surroundings of life, such as air, water, soil, and nourishment, may be of importance by virtue of being the means by which the disease germ is first introduced into us. The quite various channels of the mouth, the lungs, and the skin are available for entrance. The organs affected in an infectious disease are sometimes in the place where the disease germ enters, sometimes in tissues remote but more disposed toward the disease; the expression *locus minimæ resistentiæ* is a designation used to denote their relation.

From this standpoint we classify those diseases as contagious which can be directly communicated by mere contact with the sick and do not need a go-between; and as miasmatic or non-contagious those which are not transmitted directly from the sick but are caused by external agents. In the great majority of infectious diseases both possibilities of communication exist; one or the other is the more usual merely. In this sense malaria is never naturally contagious, but may be artificially communicated by transfusion of blood; cholera is generally not contagious; small-pox is always contagious. The concept contagion is accordingly used in a nar-

rower sense than that of infection, and if we depart from this general usage we must always declare the fact and make it abundantly evident. I say this expressly because certain bacteriologists use the term contagion to express the same conception as that implied in the term infection or wound infection. If this is done in the face of usage, of the clinical experience of physicians and of the experience of every layman, then naturally all diseases must be called contagious, for the word used in this fashion loses completely its peculiar and narrower significance. By some such quibble, for example, Koch and certain of his followers are able to declare cholera to be a contagious disease, while medical experience as well as bacteriological experiments prove plainly that cholera as a rule is not in the strict sense a contagious disease.

FERDINAND HUEPPE.

PRAGUE.

THE UNMATERIALITY OF SOUL AND GOD.

IN REPLY TO THE CRITICISM OF THE HON. JUDGE CHARLES H. CHASE.

SCIENCE is frequently regarded as materialistic, while in fact it is as little materialistic as is religion.

The difficulty consists in the meaning of the word "materialism." The term is in its popular acceptance frequently used as denoting a view which would refuse to believe in ghosts and ghost-existences of any kind. Accordingly scientists, men like Helmholz, Kirchhoff, Huxley, Hertz, etc., who endeavor to explain all phenomena of motion from the laws of mechanics, would be gross materialists, and of course, in that sense, our greatest philosophers, the teachers of all schools, even the idealists Spinoza, Kant, Hegel, Schelling, Fichte, Schopenhauer, etc., etc., would have to be counted among the materialists. Materialism in its exact significance is different. According to the terminology current among philosophers, materialism is a world-conception which attempts to explain all phenomena from matter and motion. But there are a number of people who are so materialistic in their conceptions that they materialise even things immaterial, and with these ultra-materialists materialism is frequently a name of opprobrium. Whenever they speak of materialism they mean the very opposite of the exact meaning of the word. These people, Spiritualists and their ilk, regard the soul as a kind of substance, and any one who would not look upon spirit as a kind of attenuated matter is, in their terminology, called a materialist.

What is true of the term "materialism" is true also of the

term "atheism." Most outspoken atheists are outspoken materialists, but there are also theistic materialists who would regard as an atheist any one whose God is not a corporeal being, or at least an individual Creator with human sentiments and human volitions.

The difficulty at the bottom of all these problems consists in my opinion in the inability of a certain class of people to think of things immaterial as real and effective presences in the world without materialising them, without conceiving them after the fashion of substantial things or beings. Man is naturally a materialist. He naturally overestimates the importance of his sense-experience and is apt to think that matter and energy are the only realities that exist. But matter and energy are only two features of reality, both being abstractions of certain general qualities of existence, which correspond in our own existence to sensations and volitions. Matter is the sense-perceived, energy is resistance and that which overcomes resistance. But will-resisting energy and sense-perceived matter are by no means the only realities. In addition to matter and energy there is another class of important features met with in experience which we may call by a general term form. A clock does not consist of metal, be it gold or iron or steel or wood, but it consists first of all of a definite form and the form is exactly the thing which constitutes the clock. A little thought will soon teach us that form is by far a more important abstraction than either matter or motion. For under the general term of "form" fall all those most important qualities which condition the mentality, the rationality, and the ideal aspirations of man's soul.

There are a great number of people who undervalue the importance of form. Because form, in and by itself, is not something material, they imagine it does not exist and is of no consequence. But form does not only exist, it is not only a real factor in the actual world, but it is the most important factor of all.

A materialistic friend of mine, insisting on the all-importance of matter, declared that form was of no significance because things could not exist without matter, and if matter were taken away the whole thing would be gone. Therefore he argued that matter was the essential thing that constituted the reality of things. He

said that form is a quality of matter, that matter is the real thing, and matter possesses form, not form matter. But he forgot that matter is as much an abstraction as form. There is no matter which would be nothing but matter, and all matter has both definite shape and definite structure; for under the term "form" we comprise also the internal make-up of things.

Form is that which constitutes the thing in its particular individuality, and the laws of form are that something in the world which shapes the course of events and conditions natural phenomena. Form conditions the suchness of things, matter the thisness.

We are in the habit of regarding the material as first existing and as afterwards assuming shape. The artist takes a marble block and cuts the statue out of it, as, according to the first chapter of Genesis, God took a piece of clay and formed man. But would it not be more correct to say (as does Aristotle, for example) that a certain form was actualised by being imposed upon some kind of material? The artist has the image of the statue in his mind and this image, which since Plato's time is commonly called by the Greek word idea (from *εἶδος*, image) is a more or less clearly defined conception of some special form.

In the same way, or rather with more intrinsic necessity, the idea of man existed before he originated in the process of evolution. The mental organisation of a rational being is a special application of the universal laws of rationality, and thus the nature of man, as a rational being, is predetermined in the world's constitution since eternity.

The forms of things are relations which are determined by the intrinsic laws of forms, and the "ideas" of Plato are as significant as the laws of mathematics and logic. This seems clear enough, but my materialistic friend used to say that if you took away all matter and energy nothing whatever would be left, to which statement I must take exception. If you take away matter and energy there would be left, as an intrinsic reality from which neither existence nor non-existence could escape, the eternal laws of form which by philosophers have been formulated in what is commonly termed the purely formal sciences, viz., logic, arithmetic, geometry, alge-

bra, pure mechanics, and pure nature-science.[1] Even if no material object existed 1+1 would always make 2, the rules of logic would hold good, the square on the hypothenuse would still be equal to the sum of the squares of the sides of a rectangular triangle. In brief, the laws of pure reason would be the same, for they are intrinsically necessary and hold good whether we apply them or not, whether they are realised in the actual world or not, whether they are utilised by rational beings or trespassed against by fools.

One of the greatest thinkers of mankind, John Stuart Mill, actually went so far as to deny the existence of these eternal realities which constitute the ultimate authority of logical and mathematical thought. He actually said that mathematical lines, squares, and circles did not exist, and that mathematical theorems, far from being necessary truths, were actual untruths. No wonder that he came to the conclusion that we could not know whether on another planet twice two might not perhaps make five. His conception of mathematics was so unmathematical that he regarded the mathematical line, which is without extension, not as a purely ideal construction, but as a picture of real lines. Ideal was to him tantamount to imaginary; and that materiality is excluded in the conception of mathematical lines appeared to him a sure sign of imperfection which, of course, would change the whole science of mathematics into an illusion of the mind.

Strange! If John Stuart Mill were right, then a purely imaginary conception, an illusion of the mind, a misstatement of genuine reality, would be the key to our comprehension of the whole world. Is that plausible?

John Stuart Mill's misconception of the erroneousness of mathematics is based on the materialistic assumption that material things alone are real. The truth is that the immaterial laws of form are the most essential reality in the world. They shape the immaterial conditions through which things are such as they are, and these laws are omnipresent, eternal, immutable, and intrinsically necessary. In brief, they partake of all those features which

[1] *Reine Naturwissenschaft* is Kant's term, which would mainly comprise the cognition of causation and of the law of the conservation of matter and energy.

from time immemorial have been attributed to God. Is not the conclusion justified that they are parts and parcels of God?

The laws of form are not the whole of God. They are only one aspect of God, although we must grant that it is a very important aspect of his being. They are, as it were, God's thoughts, and God's thoughts are not as human thoughts, transient. God's thoughts are eternal, and they appear to the scientist as the immutable laws of nature.

The term "law of nature" is not a good term, but it is commonly used now, and we use it because we believe it is easily understood. But we ought to know that the laws of nature are not laws in the sense of acts of legislation. The laws of nature have not been decreed by kings or parliaments; nor do natural events take place in obedience to natural laws. Natural laws are formulas which describe uniformities. Our naturalists formulate the regularities which are observed in nature, and reduce them to exact statements. The uniformities of nature are not haphazard coincidences but intrinsically necessary conditions, indicating a sameness in variety and reflecting a grand systematic order that is ultimately based on the same principles as the harmonious relations met with in mathematics, logic, and algebra.

If the laws of mathematics and the laws of nature as their applications to material actuality are part and parcel of God, then God certainly is not an individual being, not a concrete ego-consciousness, not a person in the common acceptance of the term, but a true omnipresence and a true universality. Then, he is not a thisness at all, nor any particular suchness either, but that immaterial principle which conditions all suchness of things. In a word, he would be not a man, not an entity, not any creature however great or powerful, but the superreal condition of the whole world-order, of the laws of nature and of ethical norms which are indispensable factors in the evolution of mankind.

In reply to an exposition of this conception of God,[1] which takes the characteristic qualities of God seriously and defines him

[1] See the controversy with Père Hyacinthe of Paris in *The Open Court*, October, 1897.

as superpersonal not as an individual ego-being, the following criticism was received from the pen of the Hon. Charles H. Chase, Ithaca, Mich., Judge of the Probate Court of Gratiot County:

"I have been greatly interested in the correspondence between yourself and Père Hyacinthe Loyson, published in the October number of the *Open Court*. I have read your reply twice, and some portions of it several times, that I may be sure that I catch your meaning and understand your position. It is possible that I have not now caught your full meaning; however, if I am wrong, please correct me.

"First, I cannot see any distinction between your idea of God and atheism. The atheist admits the laws of nature; indeed, he refers all phenomena to these laws. They are to him unconscious, unchangeable, incapable of volition, impersonal. In fact, he attributes to the laws of matter and the cosmos the very necessary attributes which you deify. I can see no difference except in this, that the atheist says, 'There is no God, the world is governed by law;' while you say, 'The world is governed by law, and this law is God.'

"Further, it seems to me that your position as to the soul of man and its immortality is identical with that of atheism. If thought be but a mode of motion, consciousness mere oxidation; if the whole combination of man break down utterly at death; if our consciousness be extinguished at death, then, indeed, is death an 'eternal sleep,' and man is no better off than the beast of the field, or, even, the clod he treads under foot. It may be true that he now has the satisfaction that what he may do will go on forever in influence, but in ever weakening lines of force until it is lost in the vast abyss of opposing and conflicting forces. A pebble may be dropped into the sea and the particles of water impinged upon in turn act upon contiguous particles, and so on forever; but its effect is soon lost in the multitude of greater forces which overwhelm it, though in theory the influence of the pebble goes on eternally. It seems to me that your immortality of man is merely the statement of the principle of conservation of energy,—that nothing is lost; forces appear and disappear, to reappear in endlessly varied forms and conditions. If Cæsar live only in the minds of those who read of the deeds of Cæsar, who feel, perhaps unconsciously, the influence of his great personality, how can it now concern Cæsar? He cannot know; he cannot feel; he cannot will; his immortality is merely that of name. And even this cannot be immortality; for it may be but a few centuries, or a few thousand years at most, when his name will disappear from the earth, when his immortality will be only in the infinitesimal influence which his life will exert on that far-off age, being no more than that of the zephyr which fanned Cæsar's cheek, the stream which flowed by his door, and the other conditions which constituted his physical environments.

"With such a belief in God, who is unfeeling, unconscious, without volition; and such an immortality, without feeling, without knowledge, without conscious-

ness, without volition,—well might all men take the Epicurean view: 'Let us eat, drink, and be merry, for to-morrow we die.'

"If, as you say, God is superconscious, must he not also be conscious? The brute-creation is supervegetal; but the brute has all that the vegetable has, and sensation, the rudiments of mind and reason, and volition beside. Man is superanimal; and man has all the powers of the brute, and self-consciousness and higher mental powers beside. Now, if there be a state above man, superhuman, must that state not be all that is human and more? If God be superconscious, must he not be conscious? If he be supervolitional, must he not have volition? If he be superrational, must he not be the essence of reason, the absolute reason?

"Again, is not the present view and tendency of science onesided, in that it is wholly an outside view, which reveals to us only one set of facts, and not the other equally important? Must we not investigate from an inside view, from the position of consciousness, to arrive at facts to complete the view, then adopt a theory which will harmonise the two sets of facts and phenomena? From the one point of view there appears to be nothing which cannot be referred to matter, ether, and motion; but from the other standpoint no mental phenomena seem to be so accounted for. Are there not facts and truths lying at the basis of all religions, all mental actions, not referable to matter, ether, and motion? May not investigations of hypnotism, clairvoyance, spiritualism, mind-healing, faith-healing, theosophy, reveal a set of phenomena which require a different working hypothesis? May there not be a fundamental substance, the common basis of all that we call material and spiritual, which entirely eludes all attempts to bring it into the domain of knowledge, as is true of the hypothetical ether?

"There is certainly a power of selection (volition in higher forms) in life not accounted for by the current theories of evolution. Herbert Spencer supposed he had arrived at a great generalisation expressed in his formula of evolution:

'Evolution is the integration of matter and concomitant dissipation of motion; 'during which the matter passes from an indefinite, incoherent homogeneity to a 'definite, coherent heterogeneity; and during which the retained motion undergoes 'a parallel transformation.'

"It has been shown that this law, while it is true of the inorganic world, does not hold of organic bodies; that instead of there being a resultant dissipation of motion in the processes of life, that the processes of inclusion and absorption of motion exceed those of dissipation, and that the resultant is therefore an absorption and inclusion of motion. This shows a power of selection of life, not accounted for by physical and chemical laws.

"I am inclined to think there has now been sufficient evidence adduced by the London Society for Psychical Research, and from other sources, to show that the mind can act independently of the body, independently of distance, can transfer itself in space instantaneously, as in telepathy and clairvoyance; and that, if these things be true, there is no reason why the mind or soul cannot maintain after death

its identity, its consciousness, its power of volition, and all other purely psychical powers. I am inclined to the opinion that our so-called science is quite onesided, objectively so, and that a great field for investigation lies in spiritualism, hypnotism, clairvoyance, mind-healing, faith-healing, etc.

"If the vortex theory of atoms be accepted, as it is quite extensively among scientists, and it is certainly not unphilosophic, then there is a common substratum of all matter, and the various elements are but different vortices of this universal fluid. May not the ether be that universal fluid? Or the ether itself may be a discrete mass of vortices and account for gravitation and all other apparent actions at a distance, involving so apparent an impossibility, as shown by Newton. The ether is so organised that it eludes all our efforts to bring it within the range of the senses. Is it more improbable that spirit, the active selective principle of all life, should be so organised as to elude our powers of cognition? To express the ideas in another form: Gross matter may be represented by the letter x, and the ether by dx, or differential x. The relation between these is such that if to x we add or subtract from it dx multiplied by any finite multiplier, there can be no appreciable change in x. Again, if we represent spirit by d_2x, then the relation between dx and d_2x is such that to add to or subtract d_2x, multiplied by any finite multiplier, from dx, the latter cannot be changed to any appreciable extent. These relations of abstract mathematics may represent in a crude way the distinctions between matter, ether, and spirit. The first is the material of which our bodies are formed and affects all our senses. The second eludes our senses; but from the phenomena of light, heat, electricity, gravitation, molecular attractions and repulsions, the ether must be assumed, or action at a distance (an absurd and impossible action) must be assumed. The third, also, eludes our senses and appears to have no connexion with either the ether or gross matter; but the phenomena of life, mind, consciousness, necessitate its assumption.

"If in the above criticisms I have failed to understand your position, I shall be glad to be corrected."

My kind critic, Judge Charles H. Chase, says that he finds no difference between my idea of God and atheism, but his statement is based on the assumption that God in order to exist must be an individual and concrete being. He must not be God but *a* God: an ego-consciousness that thinks and acts like a human being. The atheist, Judge Chase says, admits the laws of nature, too; and I grant that there may be some atheists who do. Mr. John Stuart Mill certainly did not admit the reality of law as such. He did not admit that anything purely formal had any reality except as an imperfect picture of material things. To him one of the simplest

arithmetical laws appeared untenable if applied universally to nature, for he denied the right of assuming the existence of anything universal and omnipresent. Thus it appears that there are atheists who actually deny the reality of purely formal relations.

Judge Chase would not deny that God is superpersonal, but he claims that the superpersonal includes the personal, as the supervegetal ought to include the vegetal. And I grant that to some extent this is true. I do not deny that in a certain sense God is personal. If personal means that which is possessed of a definite character, God is certainly personal, for God is not an indefinite generality, but is as definite as are all mathematical, logical, and moral truths. But the word person is commonly used in the sense of individual, of a concrete being possessed with a thisness, as contrasted to otherness. If there is anything that God is not, he is certainly not an individual creature that is here and not there, and is endowed with a sentiment of thisness such as we possess in our ego-consciousness. And the superpersonal in this sense is at the same time as little personal as an animal on account of being supervegetal can be regarded as a plant. Plants have many functions which animals in spite of their supervegetal nature cannot perform. It is not true that the higher includes all phases and features of the lower. Let us hope at least that man as the superbrute, a creature which is higher than the brute, has dropped some of the most characteristic features of brute-existence.

Judge Chase claims that the God of the Religion of Science as proposed in my article, is incapable of volition. Perhaps he is. It all depends on what we mean by "volition." The eternal laws are not a transient volition such as are human volitions, but they are an eternal determinedness. If "will" means the transient decision of an individual creature which this same creature may afterwards regret, God certainly has no will. But if "will" means that there is a determinedness of action, the laws of nature are certainly a will. God's will is not a transient act, but an eternal and omnipresent condition; it is the consistency of the intrinsically necessary laws which determine the character of the whole cosmos.

The materialist may recognise uniformities but he does not see

their significance; at any rate, he does not recognise the laws of nature in their moral importance. Such a scientist as Professor Huxley (who was not even a materialist) went so far as to declare that the cosmic order was immoral. Accordingly, it appears to be of greatest importance whether or not we recognise the laws of nature in their divinity and moral importance. The law of love, of mutual assistance, the longing of the individual to live in and for the whole, are not unnatural conditions. They are deeply rooted in the order of nature, and I would say that the moral laws of nature are the most important features of God's existence. We are apt to overlook the actuality of these most delicate and subtle realities in the world, but almost all the human races have found them out by experience and formulated the moral laws of society in their ethical codes to a greater or less degree of perfection. At any rate the common agreement of the basic laws of morality indicate that they are based on the nature of things and that they constitute an intrinsic part of the world-order.

We should not be afraid of being classed either as atheists or as theists. There are people who look upon every one who uses the terms "soul" and "God" as either a hypocrite or a fool, and *vice versa* some pious people are satisfied with the mere belief without understanding what the words may mean. All depends on the proper meaning, not on the words themselves. There can be no question about it that there are atheists who without knowing it are God-believers. On the other hand, there are Christian theists who without knowing it are mere pagans, and who, far from believing in a genuine God, believe in a deified creature, an image of their own making whom they worship.

Judge Chase says that the God that I believe in is unconscious, he cannot feel. And certainly when we speak of nature's laws as parts of God, we do not mean by it that they are living beings such as the poets of the pagans used to describe. In a certain sense God is unfeeling, indeed. He is the eternal sternness of the world-order, the blessing of goodness and, at the same time, the curse of sin. But God is not merely pure law, he is also applied law, and he manifests himself in this world of living, sentient beings.

He is not only the condition of all existence, or, metaphorically speaking, the father of all, but he is also the realisation of everything that is in agreement with the eternal law. God is not only the father but also the son, and this is the essential significance of Christianity. God is not only the Logos as the eternal world-order, but also the Logos that has become flesh. He appears as Christ in this world of human beings. It is God himself who suffers and seeks the right path, the path of salvation. It is God himself who comes as the divine teacher to set an example to those who have not as yet found the truth. Thus the sternness of God is counterbalanced by the love and goodness of the actualised God, who in Christianity is called Christ. It is for certain general inquisitions, such as we pursue at present, quite indifferent whether we call the God-man Christ or Buddha or any other name of religious dignity. The significance is the same, and we may be sure that if there are rational beings on other planets they will develop a similar religion in which they follow the lead of a divine teacher who reveals to them the laws of eternal righteousness, universal love and goodwill towards all.

It is true that many scientists, even men of great name and fame and astute thinkers, have a conception of science which overlooks the importance of the spiritual and moral interconnexion of things. In Mr. Spencer's opinion evolution is nothing but the integration of matter and the concomitant dissipation of motion; he defines it as a progress from the homogeneous to the heterogenous. We have on other occasions called attention to this erroneous and actually false conception of evolution.[1] Evolution is not a law that can be explained from matter and energy alone. It is not a process which can be described in purely material terms with the omission of soul and spirit.

Evolution tends to the formation of the human mind, and human evolution, commonly called progress, depends upon the increase of a clearer and more comprehensive recognition of truth.

[1] See, for instance, in *Homilies of Science*, the chapter on pp. 36–47, "The Test of Progress."

We may call it God's self-realisation, a term which will be better understood after the complete perusal of this article. Certainly, there is a deep spiritual significance in evolution, and the religious conception of evolution which would conceive of it as the manifestation of God according to the design of universal and eternal law would certainly be truer than any agnostic or materialistic statement in terms of matter and motion.

The most important application of every philosophy lies in the domain of psychology. It is natural that there the differences between my critic and myself become more flagrant.

Judge Chase is without knowing it a materialist, for to him the soul consists of an ethereal substance. Representing gross matter by the letter x, and ether by dx, he believes that we may represent spirit by d_2x. And as ether is imponderable so the substance of the soul would naturally elude detection by our senses. The main mistake of this as well as of all kindred theories of the soul consists in seeking the nature of the soul in some attenuated substance. Ether is as much matter in the general sense of the term as are the chemical elements, for indeed no objection can be made to the theory which is actually held by many most prominent physicists, that matter is but a condensation of ether. If the soul is substantial it might as well consist of iron as of ether; in our conception, however, the soul is not substantial but formal, and here as well as everywhere the formal is the most important part of reality.

Judge Chase does not seem to be consistent. He defines soul as the active selective principle of life; but is selection something that can be explained from such a substance as ether, and is it possible to think of a principle as a thing that is substantial? I grant that there is a selective principle active in man. The characteristic feature of soul, as I would say, is that which gives direction to the motions of a sentient organism. But this quality is not a substance of any kind; nor is it an energy; nor is it anything inexplicable. Direction is a matter of form, and so is that which conditions the choice made among several possible directions.

What is soul? Soul is a system of motor ideas, i. e., of mean-

ing-endowed symbols depicting the objects and relations of the surrounding world.

Accordingly, soul is comparable to the thoughts contained in a book, only that they are living thoughts. The ideas of which the soul consists are sentient forms of nervous functions which may prompt us to utter certain word-combinations, while the ideas in books consist in the forms of printed letters.

It would lead us too far now to explain the origin of man's soul. Nor is that necessary, as it has been done explicitly in other places; but we must insist on this, that man's soul is as little the cerebral substance of his brain, as the thoughts of a book are either printer's ink or paper. Man's soul as well as the thoughts of books consist of the significance of certain forms. Both are actualised through the materials upon which they have been impressed; but they are not these materials and they can be transferred upon other materials. Books are reprinted, pictures are photographed for reproduction, and the soul of every man impresses itself upon others, adding its mite to the progress of the race.

The significance of sense-impressions and of words originates through the perception of a relation between the mental picture and a certain object; it is not anything material; it is not substance nor is it force or energy. We grant that thinking takes place in the brain, and the physiological process on which the function depends is chemically considered oxidation. But for that reason thought and oxidation are as little identical as the turning of the crank of a musical box can be regarded as music.

The materialistic proposition that the world can be explained from matter and motion alone (seriously pronounced by philosophers who are sometimes regarded as deep thinkers) is simply a superstition which, when it is found to fail, naturally leads to a philosophical bankruptcy which, when glorified as the highest achievement of modern thought, is paraded under the name of agnosticism. If matter and motion contained the conditions of all things, we might with Shakespeare's clown wonder at the musical genius hidden in sheep's guts and might try to deduce the beauties of a Beethoven sonata from the friction of a bow on the strings. A

concert, the actualisation of music, is not possible without instruments, but music itself is not constituted by or explainable through the material qualities of the instruments. Music is the actualisation of mathematical proportions which are directly perceived without being calculated or at all understood in their arithmetical values. In the same way, the significance of sense-impressions and word-symbols is something relational, i. e., formal; and its most important feature is its direction-imparting faculty.

If a cat sees a dog approach, it will nimbly climb the next tree. The cat knows the dog, the tree, and its own ability of climb ing; and the cat's action is determined by the significance of the sense-impressions, which has originated under past experiences. The total amount of these memory-structures which enable the cat to interpret present impressions and utilise them for adjusting itself towards the surrounding world is the cat's soul. That the cat jumps toward the tree and not in any other direction is a quality which is not measurable in the scales of the chemist or by the methods of the physicist. It is not a material thing nor is it a force. It is purely a matter of form. That which determines the direction of the cat's motion is the significance of the mental pictures in the cat's mind.

Now Judge Chase may object, that man's soul is not the system of his ideas, but the substance in which the system of ideas is impressed. And here his theory may be introduced, that ideas are not impressed into gross matter but into the more ethereal matter called ether; to which I reply that it is quite indifferent whether the ideas of man's soul are registered in gross or in ethereal substance. It seems to me that if the soul needs must consist of a substance, it does not gain in dignity by the thinness of its substratum; at least I for my part would prefer to have a soul of solid steel than of some nondescript gas or ether. But a critical investigation will have to reject the idea of the materiality of the soul altogether and insist on the truth that the main thing of a man is the nature of his ideas, i. e., the form of his sentiments and the character of his impulses, not the substance on which they are impressed.

The term substance has been introduced for denoting a mate-

rial that might be different from matter,—a spiritual matter,—and in this sense the word has been interpreted to mean that which underlies certain phenomena, that which is standing under them or supporting them. If substance be used in the sense of forms that in material changes remain constant, we have no objection to the use of the word as something immaterial. In that case, the form of the rainbow would have to be called a substance, while the raindrop would be the material which is perpetually replaced by new material. Little, of course, is gained by replacing the notion of a sense-perceptible matter by a more subtle metaphysical matter; for both are mere materials, both denote a mere thisness, and neither, if considered as a *substantia qua substantia*, can be regarded as implying suchness, character or worth, for all suchness is a matter of form. If we compare two substances, e. g., gold and lead, we shall find that their difference is reducible to a difference of form as is actually assumed with regard to all the chemical elements in Mendeljeff's law. Supposing that there be a particular thinking substance, as there are different chemical substances, we should have to assume that its peculiarities will finally find their explanation in its structural qualities; its character would after all be a matter of form. There is no way of escaping the idea of form as that factor which gives character to things. Suppose there were a special soul-substance, what would it signify? The character of a man and his moral worth would after all depend upon form. We must shape our lives, we must build up our fate, we must train our mental and moral make-up, we must discipline our conscience, we must mould our personality. All progress, even moral accomplishments, every deed of any kind, is an act of forming.

The material of which a thing consists is only of secondary importance. The Bible is the Bible whether it is written on parchment, on silk, or on paper. The significance of the words remain the same either way. That which we call the Bible has nothing to do with the material on which the words are printed.

Now we might for argument's sake grant that the presence of ether in the brain is necessary for rendering the cerebral substance capable of performing its proper functions. What of it? Would

it bring us any nearer to a comprehension of the soul? It would simply be one step farther in the physiology of the brain, not of the soul. This is the reason why all theories which attempt to explain the soul either as a force, as electricity or magnetism, or as a substance, as ether, as phosphorus, as oxygen, etc., have always failed. They try to explain something that is purely formal by either matter or motion.

Judge Chase claims that according to our theory "man is no better off than the beast of the field." And in one sense that is true. Man's body will be dissolved into its particles just as much as the body of beasts, and this, I believe, is commonly recognised by all people alike, by both religious and irreligious. We read, for instance, in Ecclesiastes iii. 19–21, the author of which book is counted by all Christian Churches as directly inspired by the Holy Ghost:

"That which befalleth the sons of man befalleth the beasts. Even one thing befalleth them. As the one dieth so dieth the other. Yea, they have all one breath, so that a man hath no pre-eminence above a beast. For all is vanity. All go unto one place, all are of dust, and all turn to dust again. Who knoweth the spirit of man that goeth upward and the spirit of the beast that goeth downward to the earth?"

The physical part of man is in exactly the same predicament as the physical part of any beast. Man's body consists of matter; it is dust and to dust must it return. There is nothing of man's material elements that could escape disintegration in death. And supposing that in addition to the gross matter of which man's body consists there existed some ether in his brain, it is more than probable that those more rarefied substances would as much undergo disintegration as any other. If man's immortality depended upon the preservation of a substance, there would be no hope for him beyond the grave. The ether-soul which according to the belief of past ages quits the body at the moment of death and flits about from place to place, would be subject as much to a final dissolution as any material combination.

But man's soul is not material; it is formal; it consists of

ideas, of thoughts, of aspirations. And because man's soul is formal it can continue, even though the body may become a prey to death. Man's soul continues through his works; being a certain form of life-activity, man continues in his personal identity wherever this peculiar form of life-activity is preserved.

The existence of death in the world, from which no living creature can escape, appears terrible and oppressive, but as soon as we know that the soul of man is immaterial, and that, therefore, it is not touched by death, we have good reason to feel comforted. And he who understands the situation will lose all fear of death and rise into that higher plane of ideal life which characterises or ought to characterise every man of religious aspirations. In this sense the preacher continues (*Ibid.*, 22):

"I perceive that there is nothing better than that the man should rejoice in his own works, for that is his portion."

Judge Chase objects to this conception of immortality as being merely a statement of the principle of conservation of energy, but that is not so. It is a statement of the principle of the conservation of form. It is true that energy is preserved and matter is preserved, but both matter and energy change their forms, electricity is changed into motion, into heat, into potential energy, etc., etc. And similarly the chemical elements undergo various combinations in which they act differently according to circumstances. Some forces become latent, others become apparent. In new combinations, some properties seem to disappear while others rise unexpectedly into prominence as if created out of nothing. The conservation of soul is radically different from the conservation of matter and energy. Nothing that is material is preserved of an organism in its organised structure. The organism, materially considered, is a constant flux. It is comparable to an eddy in a stream where the conditions remain to a certain degree constant, so as to produce the same form of a whirl. The whirl consists of water, but the whirl is not water. You can analyse all the particles of water and the chemist will never discover what the nature of a whirl is. A chemist will search all the raindrops in vain if he searches for an explanation of the rainbow. It is true water is needed to make whirls and rain-

bows, but the water only furnishes the material for their makeup, and it is quite indifferent which drops pass through the place where they originate. The same is true of man. It is upon the whole quite indifferent at which bakery we buy our bread, or whether the wheat grew in Russia or Dakota. The question of where our cereals grow may be of commercial interest as considerations of political economy, but has nothing to do with the soul. Man's soul is neither the amount of material particles of which at the time his body consists, nor is it exactly those footpounds of energy which are stored up in the body's tissues. Man's soul is constituted by the form in which both matter and energy appear united in his body, and form implies the significance of ideas and the tendencies of aspirations.

Now the question arises, Whence does man's soul come? Does it originate out of nothing at the day of his birth or at the moment of conception? Is there any possibility of interpreting its origin as due to a transference of substance of some kind. Suppose the soul were some definite ethereal soul-substance radically different from matter and from substance of any other kind. How could we explain the increase of soul on earth? A few millenniums ago whole continents were without population. They were inhabited only by brutes of the lowest order, and now the whole earth is peopled with rational beings. Is there a soul-substance which by being fed increases? Does the law of conservation of matter not hold good for soul-substance. All these hypotheses are *prima facie* absurd. There is only one theory which explains the unlimited increase of souls, and that is the recognition that soul is form. Form can be increased. Indeed, form can be created out of nothing, and considering that the whole creation of this world is a formation, the old dogma of the creation of any new world-system out of nothing through the intervention of the divine Logos is philosophically justified.

Man's soul is in a certain sense a creation out of nothing, but for that reason its production is by no means a mystic phenomenon. The soul of the baby originates by reproduction. As every tree reproduces its own kind in its seed, so does mankind. The kind, the type, the form, is potentially contained in the seed. The formative

element of the seed is the essential part. The material element is unessential; and as a certain mass of matter is indispensable for formation of any kind it is reduced to a minimum.

Judge Chase declares that man's immortality would be comparable to the action of a pebble that is dropped into the sea, the effects of which are as much preserved as is man's soul. And Judge Chase is right to the extent that the immortality of man's soul is as certain as the conservation of the action of the pebble upon the sea. In relation to the whole universe it is perhaps also infinitesimally small, but he is greatly mistaken when he thinks that the infinitesimal influence of a life is lost in the further evolution of mankind. The very reverse is true. The importance of man's soul increases with the progress of mankind, if only his soul be of the right kind. Think only of the inventor of the wheel or the inventor of the needle. Their souls still live and have been added to by later inventions. Is it not a great comfort to know that our souls do not only continue beyond the grave but that they are even capable of a higher evolution, of a spiritual increase and of better formulation with greater exactness and precision! Far from being lost at a distant age, the soul of man gains in influence, and, if it is a power for good, will become a source of ever increasing blessings.

The immortality of Cæsar in this conception is not that we read about Cæsar in our school books, but that the deeds of Cæsar remain a factor in the future evolution of mankind; it is not the knowing about Cæsar nor the preservation of his name, but it is the reproduction of the very deed-forms of himself.

It is apparent that not all the deeds of Cæsar are equally immortal. Some of them will retain a greater and others a smaller influence. Some of them may be almost entirely obliterated, but there are features of his which by the selection of the fittest will survive for the benefit of mankind, and that exactly is the immortality of his soul, and this immortality is not limited to the people of whom we read in books, to the men of fame, but is as powerful in those whose names remain unknown: in the mother who brings up her children with love and care, in the father who toils for his

family, in the honest laborer who plods in the sweat of his brow to make a living.

Judge Chase, and probably other critics of our views will probably say that they want an immortality not only for prominent men but for everybody; and I reply that this immortality is for everybody and for everything. To be sure it is not for everybody and for everything alike. It is different for the action of the pebble on the sea and different for the hero who dies for his cause. It is purely physical in the former case, it is moral and ideal in the latter case.

The difficulty of preserving the soul of everybody consists in the rarity of original souls of importance. Most original minds are simply aberrations and the men who have discovered a new truth or set a noble example are few indeed. But every Tom, Dick, and Harry, who are at best mediocre reproductions of average souls, without any originality of their own making added thereto, also want to be assured that their puny little egos will be preserved. For this kind of people the idea of a substance-soul is naturally the best comfort, for not having any particular suchness, they cling to the thisness of their existence, and will be sorely disappointed when they find that the preservation of any thisness is not conformable to the laws of existence; man's aspirations characterise his suchness; they are ideal not material; they belong to the realm of thoughts, not to the realm of concrete objects.

I know there are people who believe that ideal means unreal, but that is a mistake. They are materialists who believe that whatever is formal must be non-existent because it cannot be touched by the hands or noted by any one of the other senses. Things ideal, i. e., presences that consist of thought-relations, are spiritual, not material, but for that reason they are as real as any stone and as actual as any one of the forces of nature. The formal, and especially the spiritual, is truly, as the Greek calls it, the causative in the world, *αἰτιώδης*.

It is difficult for mankind generally and especially for the primitive peoples of an unscientific age, to conceive of the paramount importance of the purely formal. Crude thinkers are apt to materi-

alise or even personify that which is immaterial. And thus we have the strange phenomenon that spirit is characterised as breath, as air. It is always supposed to consist of the thinnest material conceivable, and so the notion of an ether-soul recommends itself to the materialists of the present generation. But the spiritual is no substance whatever. The spiritual is formal, and the formal is not a nonentity but is the most important factor in the world.

The formal is not only in the world, but the formal relations form an abstract world of their own. There is a supernatural world of form which has been called by Philo "the realm of the Logoi," by Plato "the world of ideas," by Kant "the purely formal or transcendental."

If there is any truth in the Hegelian conception of the absolute, we must regard the formal relations as absolute. They are intrinsically necessary. Logical and mathematical theorems are not inventions, they are discoveries: they are true if considered for themselves and without reference to material things such as exist in nature. In this sense they are superphysical and form a supernatural realm; not as if they were remote from nature, but by being applicable to any possible nature. If new universes of a different kind were created, the eternal verities of formal relations would hold good for them as they do for our actual world.

The supernatural or hyperphysical world consists of all those eternal verities which would remain true even if the world did not exist. Pure mechanics is a kind of hyper-physics which explains the laws of physical motions. In *abstracto* and according to an *a priori* system, the laws of pure mechanics hold good for any kind of practical mechanics. The purely formal world is that system of laws which are absolutely true, but at the same time shape the real world and condition all its transformations. Therefore, the purely formal sciences are the key to the natural sciences. They are not real, they are super-real, and the truths which they reveal are not results of sense-experience but products of pure reason.

One most important feature of all the formal truths is this, that they stand in a decided contrast to the material world of sense-experience. They do not consist of a heap of single facts but they

form one grand system. The more we understand the nature of the formal sciences the better we learn that all of them are one and the same truth in its various applications. The simplest of them are most obvious, and the most complicated of them are nothing but the very simplest applied to complicated conditions. And not the least important aspect of the purely formal sciences is their moral importance. Not only is there a morality, nay a holiness, about the multiplication table, but morality is nothing but the rigidity of the formal laws applied to practical life, especially to the relations between man and his fellows.

If we consider the purely formal, the immaterial or hyperphysical as a whole, we understand its moral application better, and in this sense it has been allegorically represented as the father of all life, as the creator, as the Lord of the universe, as God. The attributes of God as soon as God began to be philosophically understood, are eternality, omnipresence, rigid impartiality or justice, omnipotence, omniscience. Omnipresence is only another name for universal; the former is a religious, the latter a philosophical term. To these qualities were added later on the more moral attributes of love and mercy. Now, if there is anything in the world which is capable of being called eternal and omnipresent, it is these immutable relations which are systematised in the formal sciences. They, if anything, are omnipresent and eternal. They are uncreated and indestructible. If there is anything in the world that can be called omniscient it is the sum-total of these sciences, for they are nothing less than the source of all knowledge. Indeed, a recognition of the purely formal and its eternal laws is the organon, the instrument and means by which alone we can classify and comprehend the data of experience.

It is understood that God, this omnipresence of the formative factors of the world, is not possessed of a knowledge such as man's is. It is a higher kind of knowledge. God's thought is not a series of representations. God's thoughts are eternal truths. God's thoughts exist forever and aye in the shape of determinations which are regulative features of the universe such as can be formulated by scientists in laws. Accordingly, such omniscience is not a dialectic

or argumentative or discursive knowledge of detail thoughts. It is not a consideration of single events or things. It consists in the universal arrangements of reality itself. To be sure it includes all details in its universal embrace by being present in them in its undivided entire divinity. There is not a mote in the air which can escape it or be deprived of it; or, as said Christ, "not one of the sparrows shall fall to the ground without your father." (Mat. x. 29.)

When speaking of God's omniscience we are too apt to think of his thought's as being like ours, transient and discursive, but they are eternal and omnipresent, and in this respect infinitely different from human thoughts. And this is good doctrine too which orthodox belief will not refuse to accept, as we read in Isaiah lv. 8–9:

"For my thoughts are not your thoughts, neither are your ways my ways, saith the Lord. For as the heavens are higher than the earth, so are my ways higher than your ways, and my thoughts than your thoughts."

The same is true of God's omnipotence. God is not a force that can be measured in footpounds. His strength is not power of muscle nor the might of armies. God's omnipotence is the irresistibility of his omnipresent will. It is the irrefragability of what appears to the scientist as the silent workings of natural law; it is the inevitable efficacy of the small, still voice—a truth which was found out by the Greeks, with whom the saying became proverbial:[1]

ὑψὲ θεῶν ἀλέουσι μύλοι, ἀλέουσι δὲ λεπτά.

Friedrich von Logau embodied this idea in a *Sinngedicht* which Longfellow translated as follows:

"Though the mills of God grind slowly,
Yet they grind exceeding small.
Though with patience He stands waiting,
With exactness grinds He all."

[1] In this form, which is most commonly quoted, it is found in *Adversus Mathematicos*, by Sextus Empiricus; but the same proverb occurs with a slight variation in Oracula Sibyll. 8, 14. See Büchmann's *Geflügelte Worte*, p. 231.

The human conception of God's power has resulted in the belief in miracles, after the fashion of magicians. But God is not a magician-deity, a miracle-monger. God's omnipotence does not consist in overleaping the laws of nature. It does not show itself in irregularities or exceptions. God's omnipotence consists in the immutability of his will as the formative factor of nature. Whether God's laws are obeyed or disobeyed, the law will hold good. There is no possibility of changing him or escaping the fulfilment of his will. The good man, whose actions are in agreement with God, realises the blessings of God's will; the bad man, who infringes upon his decisions changes his blessings into curses; but God remains the same in either case, and the possibilities of his nature in their various applications are inexhaustible. If miracle is a name of that which ought to impress us with awe, then there is but one miracle in innumerable applications. But how paltry are the miracles which the superstitions of the past have attributed to God in comparison with the miracles of the inventions of to-day which have become possible by a better understanding of God's thoughts, the laws of existence.

It is natural that primitive people did not see the goodness of God. They were too dependent on the forces of nature to see the deeper aspects of the divine law that works for progress in the intellectual world and not less in the moral world. The soul of the savages contains too little of God's true nature to know him correctly, their faculty of perception is still too dull, and therefore they see him only in the thunder-storm and hear him not in the still, small voice.

If we properly understand the origin of man's soul and the continuance of it beyond the grave, we learn to understand man's relations to other living creatures. Man's mind is formed in the mould of God's eternal thoughts and all the creatures coming from the same form are brothers; to the extent that they are like one another they are like different editions of the same book. The fatherhood of God teaches us the brotherhood of man. A consideration of the importance of suchness helps us to comprehend the relative irrelevance of thisness and implies the lesson which in In-

dia has been expressed in the words *Tat twam asi*, i. e., "that art thou." Other rational beings are, not less than myself, incarnations of the superphysical; they too, with more or less success, seek for deeper truths and long for a higher and nobler life. Have we not all one father, and are we not all brothers?

When we understand whence we come we learn also whither we shall fare. We come from the souls of the past and our soul will continue in the souls of the future. There is the same identity between the souls of the past and the future as there is between the soul-life of my own yesterday and of my own to-morrow. There is a continuity of form and there is a preservation and transference of the various particular forms which constitute our suchness, our character, our personality. Former souls are not strangers to me. They are soul of my soul and parts of the same spirit-life which at the present day pulses in my brain. Nor shall I remain a stranger to the souls to come. There, within the souls of the future generations, not somewhere in the sky, is the Kingdom of God of which Christ spoke. Heaven is not local, not material, but spiritual. In the soul-life of mankind are the mansions in which there is room immeasurable for all of us. There we shall be preserved with all our peculiar idiosyncrasies in our personal identity.

My friendly critic expects new light from the revelations of clairvoyants, spiritualism, hypnotism, mind-healing, and theosophy. He hopes that they will somehow throw some unexpected light upon the problems of the soul. And no doubt we shall know more in the twentieth century than we knew in the nineteenth. But the hopes which Judge Chase cherishes will probably be illusory, for the abnormal phenomena of hypnotism have so far proved nothing, except what we might have known, or rather what we ought to have known, from a careful observation of normal phenomena. But such is man. Once he is accustomed to the most wonderful phenomena of nature he will no longer notice its grandeur, but regard it as a matter of course. He will no longer notice what he is accustomed to and it will appear to him as a mere nonentity. If he be confronted with the same thing in some ugly and distorted form he will be overawed with astonishment and be brought down

to his knees in wonder. The mere fact of man's consciousness which mirrors the world in the shape of a picture of reality, and in addition classifies natural phenomena in the methodical system of a rational comprehension, elicits no admiration of the cosmic order at all. We have dreams and see in our dreams the faces of our dead brothers and sisters as if they were still alive; they prove themselves living presences to us as parts of ourselves, and we can touch them as if they had real bodies. We can speak with them and receive their answers. But people say "Such are dreams," and that is with many the end of their appreciation. Yet when we see consciousness distorted in dreamlike conditions, in a so-called hypnotic or clairvoyant state, we imagine we have seen something grand and are on the track of discovering valuable truths. When a philosopher by the determination of his will exercises self-control over physical ailments, as Kant did when he mastered his attacks of asthma, or when a general such as Frederick the Great, by his genius makes apparent impossibilities possible, conquering foes who, counting all the armies that were in the field against him, were ten times his superiors in numbers, or when a small nation like the Greeks, with a few thousand soldiers, triumphs over the millions of Xerxes's hosts, we are apt to make little of it because we can understand the laws according to which these events became possible. But when a faith-cure healer practices the same things under our very eyes on a small scale, and sometimes very blunderingly, we begin to believe in miracles, and are liable to be thrown off our balance.

Telepathy is a truth which is commonly practised in life. But the telepathy of our daily experience is different from the telepathy which the believers in psychical research try to establish. Every telegram is an act of telepathy. Indeed every sensation is telepathic. It is a sensing of that which is far. It is the act of experiencing the presence of something outside of us; and many things which our senses take note of, are at an enormous distance. The stars which we see are infinitely far, and yet we sense their reality and know of their existence! Nor is man's mind limited to the present. His memories reach back into the past, and with the as-

sistance of reason he can reconstruct the farthest event and read the origin of his own life and of the planet on which he lives. In addition he can anticipate the future. If this is not telepathy, pray what is it? I know that those who profess to believe in telepathy, as a rule, try to establish the existence of a telepathy which works without means of transmission, but such telepathy is both absurd and unnecessary, and the conception of it is an erratic idea.

We hasten to our conclusion. Religion is neither an aberration nor do its truths stand in any conflict with science. Religion is an instinctive formulation of those truths which mankind needs for practical life. The savage gropes after these truths without finding them. He feels that there is a spiritual factor in the world and he attempts to find it, but his conceptions of the spirit life are not only crude but also false. His God is formed after the pattern of his own savage mind. The religious genius of a primitive civilisation takes shape in the prophets who, poet-like and intuitively, understand the deeper significance of spiritual life, but even the prophets of the early ages use allegorical terms. They still materialise God, they still speak of the soul as though it were a substance. But how can they do otherwise? Firstly, they know no better, for they see the truth as through a glass darkly and not face to face, and secondly, if they could have expressed themselves with the exactness of modern science, they would not have been understood by their contemporaries. The prophets abolished bloody sacrifices which are a relic of savagery, and taught mankind the blessings of love. A savage chief may still think that he has disposed of an adversary when he has killed him, but experience will soon teach him that the dead may be more powerful than the living. A man who is killed is bodily but not spiritually dead. The example of his life, the experience of his soul, the influence of his personality remain after his death, and will naturally produce the belief of immortality. Nor is this instinctive belief an error. It is an undeniable truth formulated in allegories which, however, if taken literally, lead to superstitious notions.

Every man has the religion which he deserves. A sensuous man has a sensuous religion, a spiritual man a spiritual religion.

Be sure that if you meet a man who believes in a hell that is actually burning with brimstone in which the souls are roasted as the ore is roasted in the kiln, he needs that kind of sensual conception for keeping in check the savage impulses of his nature. If spiritualists believe that souls hover about them in the air in invisible winged forms, be sure that their lack of intellectuality needs a belief in the corporeality of souls; otherwise they would believe that souls have no existence and that the spiritual immortality such as the Religion of Science teaches is mere verbiage. There are people who need a religion of rituals, and it is good for them, for it educates them until they learn the truth that is expressed in rituals. I do not say that the lower religious phases should be left alone and undisturbed, that mankind should be left untaught, or that progress should be checked, but I do say that the lower stages are necessary stages of transition, and we cannot expect to lift the savage right at once to the height of a scientific conception. It would not do to send a boy who has not yet mastered his A-B-C's to a university. We must continue to teach mankind and point out the way which leads higher without losing patience with those who are slow in comprehension. We must fearlessly investigate and explain the mysteries of the spirit, but at the same time we must not expect to reap a harvest when we have scarcely sown the fields. It is natural that those who still cling to the symbols as if they were themselves the truth will be unable to comprehend the truth stated without employing the symbol, and in the same way those who still believe in a material God and a material soul will regard every view which teaches an immaterial God as atheism and an immaterial soul as a denial of the existence of the soul. Form and the purely formal are not nothing, and the philosophy which recognises the paramount importance of form is not nihilism. On the contrary it opens a vista to a scientific comprehension of God and the world, and will show us face to face what formerly appeared unintelligible and mystical.

If the term God must literally, and not allegorically, mean such a personality as our various catechisms define it to be, and if we should not be allowed to seek for a deeper and truer signifi-

cance of this most potent symbol of religious thought, science would most assuredly have to confess that there is not only no evidence in favor of the existence of God, but even that the problems of life are more easily explained without resorting to the theistic hypothesis. But why should we regard the definition of a word as unalterable in the face of the fact that all our fundamental notions, such terms as life, matter, force, have undergone similar changes. Life is still as real as ever, although our physiologists have discarded the materialistic view of life as a vital substance; fire still burns, although our physicists have ceased to believe in the existence of a phlogiston, or fire-stuff with its mysterious qualities. Electricity has become more useful than ever since we have abandoned the error of an electric fluid. So the soul will remain as grand and noble as ever, although the old psychology which assumes the existence of a peculiar soul-substance will give way to a purer and more scientific conception of the soul. And finally the idea of God which in its common acceptance is gross and pagan, will not lose by being freed of its materialistic accretions which at present are the most serious objections of scientifically trained minds to the religion that is still preached in many of our churches.

One thing is sure: that the God of the Religion of Science is not a negation of the old God-belief, but its completion and perfection. It comes as the fulfilment of a prophecy. I would not deny that the way to a comprehension of this higher God-conception leads through atheism, but where has any one found any truth worthy of the name who has not had to pass to it through doubt and had to gain it by the exertion of a close search and painstaking inquiry? Let us no longer hold atheism, I mean honest atheism and honest doubt, in abhorrence, for they are the indispensable stepping-stones to a clear and scientific comprehension of the truth. Let negations have their way; the sooner the truth of a negation is seen the quicker will its one-sidedness become apparent and lead to the new formulation of a higher and more exact positivism.

In his personal development the author of this article has successively passed through all the stages of belief, and can therefore

appreciate the arguments proffered from all sides. He knows from his own experience and still cherishes the sacred longings of a childlike mind Godward, and he is at the same time conscious of the truth that lies in the negations of atheism. But having regained a positive attitude through formulating the truth of the negations to which his conscientious doubts led him, in affirmative terms, he can now better understand the religious aspirations of his childhood and has ceased to look upon the imperfections of creeds as absolute errors. Life is evolution, and we, the children of the age in which the doctrine of evolution has for the first time been recognised in its sweeping importance, should not hesitate to understand the necessity of a progress from the mythological through the metaphysical to the positive and purely scientific. Why should we recognise this law in science and philosophy and refuse to recognise it in religion? And if the mythology of science contained the germs of glorious discoveries and inventions, should not the mythology of religion, too, be the prophecy of a purely scientific religion?

Let us have the confidence that evolution leads higher. The criticism of science will break down only the unessential, but the deeper insight which science affords will open our eyes to new truths and will show us the old truths in a new and a clearer light.

The God of the Religion of Science is in one sense the old God still, and our Godward aspiration still pursues the same aim, which is *sursum*. God is different only in so far as our conception of Him is purified,—for when I was a child I spake as a child, I understood as a child, I thought as a child; but when I became a man I put away childish things. In the place of childish hopes and notions I now have matured thoughts and manly aspirations. God is not a God of stagnation, He is a God of evolution, whose motto is: "Behold, I make all things new!" In that sense we sing the old hymn with new words:

Nearer my God to Thee,
Nearer alway;
E'en though thou other be
Than prophets say.

Other thou art but higher
Bidding our souls aspire;
Godward alway.

Doubt comes from God, in sooth,
Though conquering creeds;
Doubt prompts our search for truth
And higher leads.
Who on doubt's path ne'er trod,
Ne'er saw the face of God:
Doubt truthward speeds.

Science the burning bush
Where God doth dwell!
Truth and its onward rush
Nothing can quell.
God is the truth that guides,
Heaven where love abides:
Sin's curse is Hell.

God the eternal cause
Of truth and right;
Oneness of cosmic laws,
Reason's true light.
God, though nowhere confined,
Yet in the human mind
Showeth His might.

God is man's truthward call,
Noblest desire.
He's in life cosmical,
Love's holy fire.
Thou who art All in All
God superpersonal,
Lead Thou us higher.

EDITOR.

LITERARY CORRESPONDENCE.

I.

FRANCE.

ONE COULD NOT GIVE higher praise of M. CHARLES MISMER'S work *Principes sociologiques* than to say that, after eighteen years, a second edition of it has been able to appear without loss of interest. The author has embodied in it some detailed corrections and made some important additions, principally in the second part where he forcibly expounds his idea of the inequality of the human races and draws up a *résumé* of the history of France from a point of view which admits of contradiction but which is certainly novel.

One will doubtless be astonished that M. Mismer has remained almost an entire stranger to the great sociological production of recent years, but his work is original from the start and is the product of his personal experience which was acquired in widely different situations in the course of a life of voyages and adventures. The sociological literature would have disturbed his observations rather than have augmented them, and we must take his book as he has given it to us. What is necessary to "constitute a science"? To show how certain series of facts vary as functions of other series. This statement is true of the sciences of nature and cannot be less true of the sciences of men. The method to be followed consists, then, in studying distinct groups of events which are compared with one another according to appropriate methods, and in formulating the laws of their variation wherever it is possible to grasp them. The result was, when sociology was in its infancy and

when some subject-matter for analysis is to be had, that a generating or causal series was selected or assumed; for example, the case of Comte who referred the events of history to his law of intellectual evolution. But whatever be the importance that Comte attached to his law of the three stages and to the high generalisation which it embodies, he nevertheless distinctly felt the necessity of penetrating into the details, and he pushed his way in this direction as far as he could for this time.

M. Mismer seeks behind the fact of mental evolution for the principles capable of governing that evolution in its entirety and the social phenomena which are incarnated in it; and his principles are the principles of *perfectibility* and *solidarity*, which, being compared by him to the law of universal gravitation, would by analogical induction be central features of all existence, organic or inorganic. These principles being established, every new institution, political or social, should then be judged according to the degree of perfection which it exhibits over its predecessors, and its perfection finally would be determined by the degree of solidarity which it realised. It is obvious that these principles can be accepted without peril. But it cannot be denied that practice requires other data, and that the solution of social questions demands the analysis of numerous facts which lie between these broad general principles and concrete reality. M. Mismer does not dispute this, and in his chapters on marriage, universal suffrage, and public instruction, he appeals to considerations regarding social classes and races in particular which seem to dominate all his views of sociology. He also prizes religious organisms highly, such as Islam, and refers them to the natural conditions in which they have taken their rise.

American readers will doubtless be of the opinion that his propositions regarding human inequality have sometimes inspired him with too great a prejudice against the spirit of the new age and an excessive mistrust of individual liberty. But this lies rather in the form than in the essence of his thought. M. Mismer, though he rejects unbridled liberty still constantly appeals to the initiative of man. He knows quite well that one cannot oppose the current of history and that societies are machines which we cannot reverse.

Certain of his conclusions seem to have been first dictated to him by a patriotic concern for the destiny of France.

I would emphasise, moreover, the just principle upon which M. Mismer bases ethics—namely, the sanction of acts by their consequences. He has many beautiful passages upon this weighty question, and I for my part believe that it is impossible that experience should contradict the moral truths and sentiments which it has implanted or consolidated in the human heart. It remains for me, finally, to commend his bold induction concerning the solidarity of the worlds and the existence of a real cosmic ethics which seems to be necessary to the modern conscience.

From whatever side one approaches this work, one cannot refuse to recognise it as a remarkable production, and one has also the feeling that there is behind it a sincere and powerful personality. In the lack of solutions which will satisfy him completely, every reader will find in it ample material for reflexion and discussion, and this is the highest ambition of the author, as the motto which he has prefixed to the volume testifies: *penser, faire penser* (Think and make think).

* * *

M. Émile Durkheim gives us a work entitled *Le suicide, étude de sociologie.* His study is exemplary, both for the care which he has taken in collecting the statistical data, and for the penetration and common sense with which he has interpreted them. In the discussion which has sprung up between the sociological school which he represents and that of which M. Tarde has become the herald, I have never hesitated in according my preference to M. Durkheim, while at the same time highly appreciating the merits of his adversaries. The latter, however, are actually beginning to deny sociology. In reducing it to psychology, that is to say, to the unguided struggle of individuals, they have interdicted the conception of any law whatever of historical facts; they have abandoned evolution to the direction of chance, and by a singular contradiction deny the reality of social phenomena *sui generis*, while at the same time making individual psychology still depend upon the existence of society.

If I am not mistaken the study of M. Durkheim is the best refutation of the doctrines of the so-called psychological school according to which sociology has no other rules and no other instrument than "laws of imitation." For the most obvious upshot of the statistics when properly analysed is the influence of external social causes and of antecedent social phenomena, which contribute to determining the present state and hedge the individual in on all sides. Suicide, which appears to be a purely individual act and primordially attributable to a state of disease, distress, etc., appears on the contrary as determined by general causes and by the circumambient moral state. It springs from the characteristic structure of a society, but it particularly marks the degree of disintegration of the elementary groups composing it, and at the same time the dissolution of the moral sentiments upon which it lives and which nourish it.

Individual dispositions undoubtedly do bring it about that the current of suicide seizes this rather than that individual, but the percentage of suicides remains independent of psychopathical conditions, as it does also of climates and seasons. It varies solely with social happenings, wars, revolutions, moral and economical crises, political or civil institutions, religion, marriage, etc. This percentage which M. Durkheim has succeeded in accurately determining rises or falls with a degree of integration or disintegration of the social elements, or, stated in other terms, according as institutions, religion, marriage, etc., have a more or less firm hold upon individuals. Certain statistical facts are explained on this hypothesis which at first seem very strange. For example, that the number of suicides is greater in Protestant countries and even in the Protestant part of the same country than it is in the Catholic countries; that the establishment of divorce lowers the percentage for wives and raises the percentage for husbands, and that hence an indissoluble marriage is beneficial to the man in this regard and unfavorable to the woman.

It would be curious to know in this matter the statistics of countries in which polygamy is legalised. I regret especially that M. Durkheim has not collected, or at least has not inserted in his

work, the statistics of the United States. It would have substantially aided him in determining whether the more active participation of women in social life is really the preservative for them that he claims it is. His careful researches on the relations of suicide to marriage and celibacy conduct him to highly interesting considerations regarding the respective rôles of the two sexes; but I cannot touch upon these points here, and leave to the reader the task of meditating upon the practical consequences which M. Durkheim has drawn from his studies.

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M. HENRI F. SECRÉTAN in *La société et la morale*, and M. J. J. CLAMAGERAN in *La lutte contre le mal* treat almost of the very same questions and show the same tendency of view regarding the future of modern societies. M. Clamageran, who is one of our most distinguished parliamentarians, seeks to justify individual effort, to define the useful spheres for the activity of the social power, that is, of the State, to show the value of free association under whatever forms, and to emphasise the benefactions of the religious spirit which our time has so mistaken under pressure of the necessity which existed of repressing the ecclesiastical power. His book is the work of a wise and practical man. That of M. Secrétan is rather that of a moralist who proclaims himself worthy of the name he bears. I call attention to such aphorisms as the following: "Is it not a supreme mystery that man can conceive being only as permanent and that this notion is formulated in a consciousness which seems transitory?" Or the following: "To have a metaphysical conviction it is necessary to be restricted or to restrict oneself." His philosophy concludes for union upon the field of action; for "to live is to act."

* * *

M. L'ABBÉ C. PIAT shows greater ambition in his carefully worked out book, *La personne humaine*. The objections which he advances against the modern theory of the soul are not true, but he has cleverly presented them. The chief thing to be remarked is that the battle constantly turns about the question of method. It has ever been so since the *Discourses* of Galileo and the *Organum*

of Bacon. The Abbé Piat particularly reproaches his adversaries with the usage which they make of the "exclusively empirical method" in the problems of psychology. "People have ceased to reason," he writes, "in their effort to observe better." But after the method of pure introspection has furnished all that it could upon the question, is it not proper that we should endeavor to enlarge the boundaries of our knowledge by recourse to experiment, pathological observation, etc.? It is at least a step in advance when men like the Abbé Piat enter the lists. We may felicitate ourselves upon their accepting the services of experimental psychology and in attributing to it a useful rôle, even though they proclaim that the last word is not spoken by it and that there exists "a fundamental psychology which has nothing to do with physiology.

This reservation is partly legitimate, and I can appreciate the bias which has dictated it. But I think that the spiritualists have quite exaggerated fears regarding the dangers to which the adverse doctrines have subjected social ethics. If it be certain that ethics has sprung from the long experience of the human race, or that at least experience has constantly justified the principles of ethics, how can we suppose that the experience of to-morrow will annul the experience of to-day? Its living lessons will remain the same, whatever system philosophers may construct. Of a truth, their quarrels concerning free will, responsibility, sanction, etc., which incessantly recur, recall to mind the piquant scene which one of your most distinguished poets, Theodore Tilton,[1] has recorded as taking place between an old Christian monk and a grave mussulman sage, who at each turning of the moon came together and mutually regaled themselves by discoursing constantly on the same subjects without ever understanding each other:

"And when the same new moon was new once more,
The same old men
Thus met again
And had the same old wrangle as before!"

[1] His *Complete Poetical Works*, in one volume, recently appeared in Paris, London, and Oxford (European edition, Oxford, Blackwell, 1897). The poem mentioned is entitled "A Query for Quidnuncs."

Dr. Paul Sollier offers us more exact solutions in his *Genèse et nature de l'hystérie, recherches cliniques et expérimentales de psycho-physiologie.* This two-volume work, of which one contains the "observations" only, is quite remarkable, both for the wealth and quality of these "observations" and for the clear and new conclusions which are based upon them. M. Sollier combats with great force the theory which reduces hysteria (Pierre Janet) to a pure psychological state, like the fixed idea, for example. According to him, and I believe he is right, this psychological state is explained by the physiological state, which is characterised by the more or less profound anæsthesia of a larger or lesser number of nervous centres. In hysterical subjects the nervous centres are asleep. All their subsidiary symptoms, all their stigmata so called, are due to disturbances of the sensibility. These patients are somnambulists or vigilambulists, i. e., somnambulists who appear to be awake. The different functions of their organism are disturbed in proportion to their anæsthesia, and these functional disturbances give place to the most varied kind of accidental symptoms according to the region which is affected and the mental co-ordinations which are inhibited. The consequent method of cure which M. Sollier practices with success and pride is to effect an awakening of the sensibility. He most frequently succeeds by employing some command formulated in general terms as: "Feel your heart, feel your head," etc., but never by a suggestion properly so-called. He regards the latter—and I request that his declaration be particularly heeded—as a detestable and dangerous proceeding, especially when the anæsthesia is slight; for in such cases the operator only strengthens and provokes the gravest symptoms of hysteria. M. Sollier restricts himself to giving a start to the phenomena of reaction and does not determine their course. The awakening proceeds by physiological laws, which depend neither upon the hypnotiser nor upon the patient.

These clinical observations also furnish us with further results, the importance of which will not escape psychologists. M. Sollier has discovered the existence, at the periphery, of painful points corresponding to the zone which is affected. The most important

of these are those which lie over the nervous centres (the brain and the spinal cord). Each organism has its own sensibility. It has also its point where the pain is localised, when anæsthesia supervenes. This circumstance, it will be understood, offers a new means for verifying or recognising cerebral localisations, and so M. Sollier has furnished a new demonstration for the localisation of the visual sense in the occipital region (Munk).

We shall also point out another consequence of these studies, relative to the almost exclusive favor which, according to M. Sollier, the motor theory enjoys in present psychology. For him movement is subordinate to sensibility. He attacks, finally, with sound arguments, the duality of the body and the soul. He even formulates a theory for the production in the brain of sensations, and then of images, and finally for the formation of personality.

* * *

The book of M. PAUL REGNAUD, *Précis de logique évolutioniste, l'entendement dans ses rapports avec le langage*, is certainly the work of a learned linguist, but his definitions are frequently wanting in precision and clearness. I shall not take sides, now, between the school which M. Regnaud represents and that to which M. Victor Henry belongs, whose "linguistic antinomies" M. Regnaud vehemently assails. I shall limit myself to an observation touching the exaggerated importance which the majority of linguists and some philosophers attach to the phenomena which have been called "diseases of language." These diseases are said to have given birth to myths. It has been unjustly supposed that the savage is not susceptible of receiving false images through his senses (what of illusions, then?), or at least is not susceptible of interpreting falsely correct images by his reason. To take a name for a being, to take the sacred fire for Indra or for Jupiter, what is it if not yielding to a natural tendency of the mind? Is the truth not this: that man, and especially primitive man and the child, spontaneously conceive things under the form of being, because they find in themselves, in their muscular effort, in their will the type of every action? Add to this to complete the explanation, the passion for fables and the taste for the marvellous. That diseases of language have some-

times furnished, and do still often furnish, a sort of primitive subject-matter for the human imagination, I willingly grant, but that is all.

From the pen of M. H. FIERENS-GEVAERT we have an *Essai sur l'art contemporain*, a non-didactic work which has the ring of a clarion note amid the turmoil of modern artists. From the pen of M. C. R. C. HERCKENRATH, professor of the French language in a college in Holland, we have *Les problèmes d'esthétique et de morale.* The author who is a distinguished man has thought out anew, and sometimes with an original turn of mind, thoughts which are not new. He makes no pretensions to building up a doctrine, but knows how to recast the old doctrines with grace and sense.

From M. J. MILHAUD we have to note a second edition of the *Essai sur les conditions et les limites de la certitude logique;* from M. ÉMILE BOUTROUX, professor in the Sorbonne, a work *Études d'histoire de la philosophie*, a series of essays having for subjects Socrates, Aristotle, Jacob Böhme, Descartes, Kant, the Scottish philosophy and their influence on French philosophy.[1]

LUCIEN ARRÉAT.

PARIS.

II.

A NOTE FROM ALSACE.

Your correspondence with Père Hyacinthe in the August *Open Court* last, is fresh proof of the difficulty with which even advanced and liberal Catholics absorb monistic ideas. Catholicism is dualism, and the extent to which the so-called "Old Catholics" of Germany are still Catholics is abundantly demonstrated by the latest declaration of Bishop Weber of Bonn. On the other hand, the modern view of the world is gradually gaining more and more ground in Catholic countries, notably in Italy, and next in France, where Fouillée and others of a more or less monistic cast of mind,

[1] All the works mentioned are published by Félix Alcan.

are finding more and more adherents, and the old academic spiritualism is in its last gasps. New life generally is stirring in philosophy in this latter country, and there are indications of a growing interest in our philosophical classics. By the divorce of psychology and metaphysics both sciences have made distinct gains. It is here as in every-day life, where friends so frequently learn to value each other's friendship only after separation.

The *note comique* of the philosophical spring has been struck by JEAN MACE in his *Philosophie de poche.* Mace conjectures that man is not sprung solely from a Simian ancestry, as we have long thought, but that he was engendered in illegitimate marriage and born of an unnatural alliance. Man's ancestor was a bastard of a monkey and a bear. What wonder, then, with such forefathers, that human nature should be so utterly depraved! For Adam was the bear, Mother Eve the monkey. To the former we owe the solidity of our character, to the latter our physical and intellectual mobility and elasticity. As to the respectability of such descent nothing, therefore, can be said. But the persons who have really been disgraced are the bear and the monkey who have suffered themselves to be so far outstripped by us.

What fruitful thoughts Mace's theory of human genesis suggests, and what a flood of light it sheds on universal history. Mankind, particularly European mankind—despite comparative philology and its dogma of the common origin of the chief European races—is doubtless the polygenetic result of various crossings of this kind: the Russian (Slav) has sprung from the monkey and the bear, the Germans from the monkey and the dog, the Romance peoples from the monkey and the cat (presumably the tiger), the Semitic peoples from the monkey and the vampire, and so on. The Russian greed for land, German loyalty, the Romanic vendetta and cruelty to animals, and all the rest, thus find their natural explanations. *Sed ad seria!*

The *clou* to the most recent philosophical literature is HARTMANN'S *Doctrine of Categories,* well known to the readers of *The Monist.* It is still the same old "primordial chance," and "absolute stupidity of the will," or more properly "the absolute non-

search. When its study of such phenomena is completed the results are handed over to the central science, "that general philosophy which strives to explain the unity of all creation."

The analogy drawn between language and religion is a proper one; for both are human phenomena and both are subject to growth and decay, it being the office of science to investigate the laws that govern this dual process, a process which operates throughout the whole realm of organic development. What is intended by "development," in relation to religion may be gathered from the statement that morphology is concerned with "the constant changes of form resulting from an ever-progressing evolution." It will be well, however, to consider a little more in detail what meaning is attached by Dr. Tiele to that term as applied to religion. All religions undergo development to some extent, as all have their periods of decline. But religion itself, as distinguished from the forms it assumes, is being constantly developed, a process which is described as the evolution of the religious idea in history, or rather as "the progress of the religious man, or of mankind as religious by nature." This progress is required by the unity of the human mind, the law by which this is governed being also the chief law of religious development. The change is an inward one and it is not concerned with religious externals, such as dogmas, ritual, and observances. These have to be studied to see what is behind them. Religion has to do with man's general disposition and his views of life and the world, which are reflected "in the ideas he forms of his God or gods, and of their relation towards him." Thus religious development is a change in the ideas entertained by man as to his relation towards God, and so far as possible, "he transfers his sentiments and views to his God," and whatever change takes place in them is reflected in his conception of God. To the objection that this is a denial of divine agency, a disguised materialism, Dr. Tiele replies that, to the devout, God reveals Himself "in the orderly and methodical progress of development," and "in the life of religion more perfectly and gloriously than in the caprices of an inscrutable will." This view will meet with ready acceptance from those who recognise the operation of the law of progress in the visible external world. That it operates equally in the world of mind is undoubted, and Dr. Tiele makes use of this fact for the purpose of ascertaining and formulating the law which governs religious development. The law is stated as follows: "All development, apart from the natural capabilities of men and peoples, results from the stimulus given to self-consciousness by contact with a different stage of development, whether higher or lower."

The law of development, as formulated by Dr. Tiele, is based on the principle that intellectual intercourse promotes development, while seclusion and isolation hinder it. Many illustrations of the truth of this principle might be derived from the history of human culture, and it is embodied in two practical rules, which flow from the law of development, when applied to a religion. Of these rules, the second affirms that "religious development is best promoted by the free intercourse of

its most diverse manifestations." The other rule is of a similar character, but it is less general in its application. It is expressed as: "The religion that will attain the highest development is that which is most alive to the genuinely religious elements in other forms." The way in which this rule is stated may lead us to think that it is intended for future application, and when we consider the past history of religion, it seems as though the adherents of one form of religion were loath to admit that any other form possessed genuine religious elements. As to the rule affirming the benefit of free intercourse, it is different, such intercourse being absolutely necessary for the assimilation which Dr. Tiele affirms truly to be the mode by which all development, and therefore religious development, takes place. A striking example of this process may be seen in the relics of the old Teutonic cult which have become incorporated with Christianity, as evidenced by the survival of the ancient festival names Yule, Easter, and Whitsuntide. It is probable that the reception of a new religion is always attended with the assimilation, which is necessarily a gradual process, of various features of the displaced faith. However this may be, we think Dr. Tiele is quite right in rejecting the popular belief that a new religion can be mechanically spread and adopted, that is, without such assimilation, or without a crossing of the old and new religions giving rise to a fresh development. In illustration, he refers particularly to the spread of Mazdaism throughout the Persian empire, the facts connected with which show, that, instead of a lower religion being discarded and replaced by a higher religion, "the existing religion of Iran assimilated as much as it could from the Zarathushtrian doctrine, and thus, although it mutilated the doctrine and applied it very imperfectly, was itself reformed and proceeded to develop itself in this direction."

We have devoted so much space to a consideration of the principles which govern religious development, that we can give but a short sketch of Dr. Tiele's conclusions as to the several *steps* of such development and the *directions* in which it has taken place. The former constitutes religious morphology and has to do with the forms under which religion exists, while the latter has reference to the lines along which religious development takes place. Dr. Tiele adheres to his earlier division of the forms of religion into the two chief categories of *nature* and *ethical* religions. These are sharply distinguished, the former being devoid of doctrinal teaching such as appears in the ethical religions as revealed truth. Nature religions originate in animism, with which fetishism, totemism, and idolatry in general are connected, through spiritism the belief that spirits can wander about from object to object at will—to organised polytheism. This exhibits two distinct steps of development, the therianthropic, in which the gods assume animal forms, and the anthropical. The latter shows the beginning of an ethical movement, in the attempt at a purification of the world of the gods, but it did not lead to the establishment of an ethical religion, as this required the substitution of a spiritual and personal God for the nature gods.

Among the causes which determine the directions taken by religious develop-

ment, Dr. Tiele seems inclined to give the first place to race, comparing the development of religion to that of language, the study of which has yielded a classification of peoples. The study of religions has led to a similar result, showing that religion has developed in different directions with the Aryans and with the Semites, the former being *theanthropic* and the latter *theocratic*—here the gulf between the human and the divine becoming widened, instead of being bridged over and man becoming God. Religious development requires that these two streams shall unite and thus give rise, through reconciliation of opposing ideas to a higher form of religion in which opposing tendencies are harmonised. Such Dr. Tiele thinks is the case with Christianity, the appearance of which inaugurated an entirely new epoch in the development of religion. The two-fold process of ever-increasing differentiation combined with efforts at reconciliation and unity, is observable in the general development of the human mind, as well as in the sphere of religion, and here we have the key to Dr. Tiele's theory, which is that of evolution. Any other position is now untenable, and we know of no other work on the subject in which the theory of religious development is so ably presented as that here reviewed.

C. S. W.

A History of Christianity in the Apostolic Age. By *Arthur Cushman McGiffert*, Ph.D., D.D., Washburn Professor of Church History in the Union Theological Seminary, New York. New York: Charles Scribner's Sons. 1897. Pages, 681. Price, $2.50.

This work is the fifth volume of the International Theological Library, edited by Dr. Charles A. Briggs of the Union Theological Seminary of New York, and Dr. Stewart D. F. Salmond of the Free Church College at Aberdeen. The enterprise is praiseworthy and a good symptom of the scientific spirit of the age; it proposes to serve the purpose of theological science by offering text-books to students of theology and to render theological questions, as scientific questions, accessible also to students of other departments. The programme is promising, and we mention among the books in preparation the large *Theological Encyclopædia*, by the American Editor; *Old Testament History*, by Prof. Henry Preserved Smith; *The New Testament Literature*, by the European Editor; *Comparative Religion*, by Fairbairn of Oxford; and *Philosophy of Religion*, by Flint of Edinburgh, etc.

Professor McGiffert sketches in a few pages (1–35) the origin of Christianity, limiting himself to Judaism, John the Baptist, and, above all, Jesus, but omitting the question of the influences which formed this extraordinary personality. The second chapter treats of Primitive Jewish Christianity and the conflict between the Christians and the Jews (pp. 36–93). The Christianity of Paul and the work of Paul (pp. 151–439) constitute the most important part of the book, at which the author apparently has labored with great devotion. The fifth chapter, on the Christianity of the Church at large (pp. 440–545), touches only lightly upon the problems of the Four Gospels, and are mainly devoted to the writings that go under

the names of John, Peter, and Paul; and the last chapter, on the development of the Church (pp. 546–672), pictures the origin of its institutions under James in Jerusalem, under Peter in Rome, under John in Asia. Our author, in contrast to the critics of the New Testament, believes in the genuineness of the Epistle of St. Peter and accepts the tradition that the John of Asia is actually the Apostle John.

The book is upon the whole very conservative, which may be the main reason why the author has limited himself to the traditional sources of Church history and does not even seem to have thought of utilising the rich material which is offered by a comparison of Christianity with pre-Christian Religions, which promises to throw much light upon the faith of the apostolic age. The influence of non-Christian religions was not direct but indirect, and can be traced in the Apocrapha of the Old Testament, especially the wisdom literature and the various apocalypses from Daniel down to the Apocalypse of Enoch, even including the Revelation of St. John the Divine. But we must not prescribe to an author the subject on which he should write, if he only (as is here the case) writes well on the subjects which he chooses.

The daily papers bring the information that the author will be subjected to a heresy trial, and hint at the probability of his meeting with the same fate as Dr. Briggs. We hope that the statement is premature for if criticism in this mild dose be heresy, then science must be blasphemy; and woe to that Church which deliberately would expel every man who dares to be a thinker! P. C.

SECHZIG UPANISHAD'S DES VEDA. Aus dem Sanskrit übersetzt. Und mit Einleitungen und Anmerkungen versehen. Von *Dr. Paul Deussen*, Professor an der Universität Kiel. Leipsic: F. A. Brockhaus. 1897. Pages, 920.

The Upanishads are religio-philosophical discussions which mark the awakening of a spirit of inquiry in India and form a period of transition from the religion of tradition to the religion of independent thought. It is the age of Vedantism, i. e., of aspirations which seek to fathom the aim or end of the Vedas and discover the Brahm, i. e., the All-soul of the world in man's own self, which is called the âtman. If the Vedas are comparable to the Old Testament and the Buddhist Canon to the New Testament, the Upanishads represent the period of transition which would render them analogous to the wisdom literature and other apocryphal writing of the Jews. Paul Deussen, however, whose philosophical standpoint is a modernised Vedantism, naturally compares the Upanishads to the New Testament itself, which would relegate the further evolution of Buddhism to a revolutionary movement undermining the fundamental notions of religious philosophy by denying the existence of an âtman. But whatever views Deussen may entertain, and whether or not we agree with him in metaphysics, we must be grateful to him for the enthusiasm which has prompted him to bring out a collection of translations of Upanishads which is by far the completest of all. Max Müller, in *The Sacred Books of the East*, has published twelve Upanishads in two volumes, and here we have

sixty Upanishads most of which have never been translated before while none of the Upanishads with which we are familiar through former translations have been omitted. The introductory notes to each Upanishad have the advantage of conciseness and the translations themselves are at once clear and dignified. κρ.

INFALLIBLE LOGIC. A Visible and Automatic System of Reasoning. By *Thomas D. Hawley*, of the Chicago Bar. Lansing, Mich.: Robt. Smith Printing Co. Pages, 659.

This is a book of rising six hundred pages, bound in sheep, prepared "for the use of lawyers, ministers, teachers, and for every one who is interested in the *art* (italics ours) of reasoning."

The logic on behalf of which the author of this book has been moved to take the rôle of an expositor is a system of dealings with terms and their negatives respectively. The terms of any set of premises and their negatives are to be combined in every possible way; then the combinations are to be examined and all those rejected that are inconsistent with any one of the premises. The remaining combinations are to be regarded as so many conclusions.

As a convenience for this process the author has invented his Reasoning Frame a system of rectangular diagrams rectangularly divided after the fashion of a multiplication table.

The author tells us that his method was discovered by him in March 1895, less than two years before the publication of his work.

The work is unlike, and yet like, the logic-books of the prevailing style, that is to say, such as are written by that school of logicians who while writing voluminously upon logic, ever and anon will fall to inquiring of one another, What is it anyway that we are writing about? There are no doubt many of such that will think and speak of this work disparagingly. Any respectable logic, they will say, ought to have its doctrine of terms, its doctrine of propositions, Aristotelian (with its paralogisms) or Thompsonian, its system of syllogisms and its discourse on fallacies, but here is a book that pretends to grind out conclusions by a mere mechanical process. Of course it must be a book that has usurped its title.

Let them then show wherein their own treatises have a better right to the title of Logic and wherein the same are more useful or more promising than is this one. It has been said, "If one were to inspect a fair proportion of the more extensive "recent works on Logic, the conclusions drawn would have to be that, while the "matters treated show a slight similarity, the diversity is so great that it would be "impossible to select by comparison and criticism any certain body of theorems "and methods and assign to them the title of Logic. Looking at the chaotic state "of logical text-books, one would be inclined to say that there does not exist any-"where a recognised currently received body of speculations to which the title of "logic can be unambiguously assigned."

If this be true the title of this book is no more a usurpation than are the titles of most of the other logic-books.

Logic should mean the *science* of reasoning, that is to say, there is occasion, opportunity, and much good material for a just and adequate account of and report upon that mental operation that is called reasoning. If such a science were not called logic what then would be an apt name for it?

Such a science would have for its leading trait a well-conceived doctrine of what reasoning consists in. It would give an illuminating account of that important operation and would show how and by what warrant it is that we pass from one or more premises to our conclusions. It would not depend upon a judiciously selected array of "elegant extracts" as a plausible means to give it a tenure to which it was not justly entitled, but would scorn to invite any esteem that any the most unsparing competent criticism could take from it.

It would not remain content and conceited in a development arrested at the puerile stage, but would after being well conceived, well delivered, and well formed through its early history show a health, vigor, and growing nature that would promise a maturity fit to explain the reasonings of mature minds.

If we stop and go no farther it is no explanation of any consequence to be shown how we are reasoning soundly when we infer that we shall die because all men die. Such inferences as examples of the *rudiments* of reasoning are of importance, but as examples of reasoning in its general scope they are precisely on a par with the arithmetical theorem that two and two make four. Jones, a statesman, wishes to get Smith, another statesman, to support his measure. Smith is under great obligations to Robinson, and Robinson is very friendly to Jones. So Jones reasons thus: I can persuade Robinson, and Robinson can command Smith, *ergo* I can control Smith. This is a type of reasoning not less demonstrative in its nature than simple syllogism and used a thousand times more frequently. And yet the ordinary logic-books have not a word to say in explanation of it.

Such a science as the one we have specified would also be a fund of diversified information relating to the various *arts* of reasoning. For while the science of reasoning is in its nature single, the *arts* of reasoning are various. Any *art* of reasoning depends largely for its features and merits upon the medium it sees fit to take or invent. We do our reasoning in and about accounts and many other things by means of the Arabic digits, the Indian cipher, and the arithmetical algorism pertaining thereto. If we tried to perform the same reasonings by means of the Roman or the Greek arithmetical notation or by means of the syllogistic figures and moods we should very soon find out how important a rôle is played in such kinds of inference by the mere medium employed. In like manner, so it is with a large range of other reasonings for which that medium called algebra has been invented. We ought to see even in the case of arithmetic that what we really do is first to translate our problem from ordinary language into another language, viz., arithmetic, then perform our reasoning in and by arithmetic until we reach our conclusion and

finally we translate our conclusion back into ordinary language. But arithmetic has become so engrafted into, or rather upon, ordinary language that the fact that we really use a medium for our reasoning, materially different from ordinary language is not readily perceived. It is, however, plain enough to be seen when algebra is used. The fact that algebra and arithmetic are only fit for certain limited ranges of reasoning is a circumstance of no moment whatever to the philosophy of the subject.

Ordinary logic-books labor under the tacit assumption that ordinary language is the only medium available for any general art of reasoning. It seems never to have occurred to any of the authors of such books that it would be worth while to inquire and find out whether it would not be possible to elaborate a medium for reasoning in general, analogous to algebra and such, that as in algebra we could translate our premises into the language of that medium, perform with advantage our reasonings to conclusions in that medium and then translate our conclusions back again into ordinary language. Quite contrariwise, the authors of ordinary logic-books of recent delivery while aware in a general way that divers and sundry persons have severally and actually worked out and submitted for approval each his own scheme and example for such a medium, have never paid to such schemes and examples any sort of competent attention preferring to assume an innuendal logical omniscience and follow the beaten track of pretentious inconsequence.

Those, however, who have thought it worth while to prosecute the inquiry above mentioned have found out that there is not one single art, but many arts of reasoning, and that of the various arts of reasoning possible, it is quite a question which one, if any single one, would on the whole prove to be the best fitted for reasoning in general. They see also that it may turn out that one *art* and the medium and algorism appropriate to the same will prove best adapted for one range of inferences, while another art and its medium and algorism will prove best for another range.

By inquiring into the various *arts* of reasoning, their media and algorisms respectively, there ensues an access of information regarding reasoning in general, so that it can be seen that a genuine *science* of reasoning can reasonably be expected after a due measure of such study. Hence the book under review is well worthy of attention and study.

FRANCIS C. RUSSELL.

THE PSYCHOLOGY OF SUGGESTION. A Research into the Subconscious Nature of Man and Society. By *Boris Sidis*, M. A., Ph. D., Associate in Psychology at the Pathological Institute of the New York State Hospital. With an Introduction by *Prof. William James*, of Harvard University. New York: D. Appleton & Co. 1898. Pages, x, 386.

The indorsement by so high an authority on psychological subjects as Professor James will be sure to attract attention to this work, although it makes no reference to the phenomena of so-called Spiritualism with which his name is sometimes

associated. Dr. Sidis does, however, deal with certain phenomena which are sometimes claimed by the adherents of that semi-cult, but he explains them without calling in the aid of spirits, regarding them as incidentals of the existence in man of a subconscious self in addition to the primary self of the ordinary conscious life. He refers to certain well-known cases of double and treble "personality" in proof of that existence, and as evidence that "the subconscious is not a mere unconscious physiological automatism, but a consciousness, a self in possession of memory, and even intelligence, and that this hidden intelligence may even possess some degree of self-consciousness." The facts cited by Dr. Sidis undoubtedly prove the existence, under abnormal environments at least, of a something which, for a period of shorter or longer duration, usurps the place of the primary personality.

The physiology of the subconscious factor is illustrated by an ingenious "plan of the organisation of the brain cells into groups, systems, communities, clusters, and constellations." By reference to this plan we can understand what is meant by the retraction of the processes of the brain cells, which Dr. Sidis supposes to be the cause of the dissociations that lie at the root of double personality, subliminal consciousness and related phenomena. As to the *character* of subconscious self, it is interesting to note that it is stupid, credulous, devoid of any sense of the true and rational, and, when cut off from the waking person, of all morality and conscience. It is, says Dr. Sidis, "essentially a brutal self," and has no true personality. Its chief characteristics would seem to be its great plasticity and suggestibility, and it is the seat of all the phenomena which come under the head of the psychology of suggestion. The experiments made by Dr. Sidis on this point are of great importance, and confirm the opinions that suggestibility is not confined to abnormal subjects, and that "the primary self alone possesses true personality, will, and self-control." How far they will lead to the solution of the problem of personality, Professor James appears to be doubtful, but we think the third part of the work, which treats of the suggestibility of crowds, throws considerable light on it. Dr. Sidis speaks of "the gregarious, the subpersonal, uncritical, social self, the mob self, and the suggestible subconscious self," as identical. It is, indeed, the social and hereditary element, representative of the past, which every one possesses in common, but which is the soil out of which are developed their distinctive personalities,—in other words, the *individuality*, which M. Ribot in his *Diseases of Personality* identifies with the organic factor. In this direction must be sought the solution of the problem of personality, and Dr. Sidis's work contains much that has an essential bearing on the subject.

C. STANILAND WAKE.

NATURAL CAUSES AND SUPERNATURAL SEEMINGS. By *Henry Maudsley*, M. D. Third Edition. Revised and Rewritten. London: Kegan Paul, Trench, Trübner & Co. 1897. Pages xi and 324.

The fact of this work having reached a third edition is evidence of the estimation in which it is held. In its present form it is not a mere reprint. The text of

the work has been modified for the purpose of presenting the argument more perfectly, and thus its value has been enhanced. Even those who do not accept Dr. Maudsley's conclusions must, if fair minded, acknowledge that his method is good. It is essentially critical, and criticism of opinions not established on the immediate basis of truth is always beneficial if conducted in the right spirit. Of course Dr. Maudsley's argument is directed against the belief in the existence of the supernatural, which belief he asserts to be due to the imperfect action of the human mind, and it deals with the chief classes of errors comprised under the heads of (1) natural operations of the mind, (2) operations of the unsound mind, and (3) the extraordinary state of mind which is called spiritual. It is a curious fact that Dr. Maudsley speaks of the several causes of error in the thinking thus classified as having led to "wrong theories of the supernatural," as though there were or might be a right theory. This may be a slip, as throughout his whole work he insists on the nonexistence of the supernatural, and yet in places he refers to the existence of a cosmic power which his opponents may regard as differing but little from that which he seeks to discredit.

The fact is that Dr. Maudsley's argument is directed, practically, against the use of the term "supernatural," rather than against the actuality of what the term denotes. Let the bounds of nature be extended, as they should be, so as to embrace the universe of things, and the existence of that which the human mind has usually regarded as supernatural is not really affected. Man measures the activities of nature by himself, and whatever he cannot understand is to him beyond nature. Hence he peoples the universe with beings of superhuman power and attributes, whose authority finally become merged into that of a single deity, who is the autocratic ruler of heaven and earth. Those who object to the existence of the "supernatural" usually have in view such superhuman beings. But their exclusion would not destroy the cosmical realities to which man applied that term, as being outside of nature as he understood it; just as the destruction of systems of theology need not be accompanied by that of religion, which "has always been at work in the processes of what men are agreed to call human progress." This is a necessary inference from one of the two elementary truths which Dr. Maudsley draws special attention to in his Preface, the other being that the source of human progress, individual or social, must be sought, not in intellect or reason, but in "the deep, permanent impulses of feeling which incite men to live and to grow into larger life." This larger life is the realisation of the altruistic sentiment which sees in humanity at large the extension of oneself. We must remember, however, that the spread of the branches of the tree is but the visible half of its growth. The greater the spread of the tree's branches, the deeper is the ground penetrated by its roots. And so it is with man. The wider his human sympathies the deeper become his cosmic associations; and what was before supernatural is found to be merely an aspect of the nature of which man himself forms part.

We have preferred to dwell on this feature of the subject rather than to exam-

ine Dr. Maudsley's special conclusions. That most of the phenomena to which he refers are traceable to some abnormal condition of the organism, where they are not due to defective observation, is certain; but it is no less true that their real origin has yet to be discovered. With reference to the phenomena of Theopneusticism which occupy the third part of the work, the fact that the "spiritual intoxication" they exhibit can be induced by the use of drugs, shows that they have an organic basis. Dr. Maudsley remarks that to admit the validity of the methods of ecstatic revelation side by side with the positive method of knowing proper to the natural understanding is to divide the mental being in two, and so to render real unity of thought and feeling impossible. The difficulty is, however, that we know so little of the nature of mental action that we cannot yet assign the psychological value of what appear to be abnormal states. If the "unknown and ineffable" something of which Dr. Maudsley speaks, when referring to the opposition between atheism and theism, really exists, may it not be the source of the "spiritual" phenomena of which he treats? They are not always attended with weakness of moral fibre any more than genius is always accompanied by incipient insanity. And thus it may be that while the author so ably analyses the sources of error, the truths may be found where he least suspects it.

C. STANILAND WAKE.

AFFIRMATIONS. By *Havelock Ellis*. London: Walter Scott, Limited. 1898. Pages vii and 248. Price, 6 shillings.

In this book we have a study of certain facts of life, as they appear in literature or are suggested by it, which the author thinks it advisable to emphasise, now that the "yet unwashed toilers" of the present century have risen up, "in half-intoxicated jubilation, over the triumphs of their own little epoch, well assured that there never was such an age or such a race since the world began." It is the object of *Affirmations* to show the falsity of this notion by insisting on the eternal verities of life, especially under their questionable aspects. Mr. Ellis's subjects are well chosen for this purpose, and it is fitting that he should take for his opening essay the philosophy of Nietzsche, who may be regarded either as a survival from the pre-Christian era or as the harbinger of the downfall of Christianity, according to what the ensuing century brings forth. This essay occupies more than one-third of the entire work, and is a careful study of the unfortunate philosopher's ideas and of the influences which affected him. Its perusal confirms the theory that genius and insanity may not be far apart, and shows that from an early period the final catastrophe was foreshadowed. This does not necessarily, however, affect the value of this philosopher's teaching, the aim of which was to remodel the moral world by the establishment of "master morality" in the place of the "slave morality" of Christianity. Mr. Ellis explains Nietzsche's theory, which on the surface appears to be morally retrogressive, as being "simply a vigorous hatred of all dreaming that tends to depreciate the value of life, and a vivid sense that man himself is the *ens realissimum*."

This view of morality is very well so long as man is guided in his conduct by lofty principles, as was Nietzsche himself, notwithstanding some of his questionable utterances. But men usually live on a lower plane, and if they feel that nothing is forbidden their conduct will display the influence of sensuousness rather than that of reason. Such was the case with most of the personages whom Mr. Ellis has chosen to illustrate his own opinions. There are, besides Zola, Casanova, the professional libertine of the eighteenth century, whose *Mémoires* we are told read like a fairy tale, and Huysmans, the modern French novelist, whose æstheticism is of a high order, but who has so profound a sense of smell that he is able to devote a whole essay to defining and differentiating "the odors of feminine armpits"! The author of *Affirmations* says rightly that he has a predilection for the questionable aspects of his subjects. His last study, entitled "St. Francis and Others," is concerned largely with the various phases of purity, which he judges from the standpoint of the saying, "to the pure all things are pure." Unfortunately few persons attain to the degree of moral strength here implied, and admirable as Mr. Ellis's work is from a literary standpoint, we think it comes within the category he himself adopts when he says "certain books possess a value that is in the ratio of the spiritual vigor of those who use them, acting as a tonic to the strong, still further dissolving and enfeebling the weakness of the weak." C. S. WAKE.

STUDIES IN PSYCHICAL RESEARCH. By *Frank Podmore, M. A.* New York and London: G. P. Putnam's Sons. 1897. Pages, 458. Price, $2.00.

The present volume is an outgrowth of the work of the Society for Psychical Research, in the *Proceedings* of which body some of its articles have appeared. The titles of the Chapters are as follows: (1) Spiritualism as a Popular Movement; (2) The Physical Phenomena of Spiritualism; (3) Spiritualism and Psychical Research; (4) Poltergeists; (5) Madame Blavatsky and Theosophy; (6) Experimental Thought Transference; (7) Telepathic Hallucinations; (8) Ghosts; (9) Haunted Houses; (10) Premonitions and Previsions; (11) Secondary Consciousness; (12) Impersonation, Obsession, Clairvoyance. Mr. Podmore's views may be characterised as moderate. We give one example of his opinions: "More than one view "is possible of the general effect of the evidence. To some of my colleagues, it "seems to indicate that thought can influence thought, untrammelled by the ma- "chinery of sense organs and ethereal undulations; that the human soul can, while "still attached to the body, transcend the limits of space and time and the laws of "the physical world; and can after the death of the body prevail to make its pres- "ence known to us here. To my thinking, the evidence is too slender and too "ambiguous to bear the weight of such tremendous issues; and though I hold that "there are grounds sufficient to justify telepathy as a working hypothesis, the proof "of its transcendental nature is still wanting." The attitude of the book generally is in harmony with the declarations and spirit of the Society for Psychical Research.

the aim of which has always been to ascertain "the facts of the case," and will, from the very nature of its subject, find many curious and eager readers. *p.*

STUDIES IN THE PSYCHOLOGY OF SEX. Vol. I. Sexual Inversion. By *Havelock Ellis*. London: The University Press. Pages, xvii+204. Price, $1.75.

Mr. Havelock Ellis has approached a very delicate subject in the present work. Yet, as he says, "these things concern every one; the study of these things concerns the physiologist, the psychologist, the moralist. We want to get into possession of the actual facts, and from the investigation of the facts we want to ascertain what is normal and what is abnormal, from the point of view of physiology and psychology. We want to know what is naturally lawful under the various sexual chances that may befall man, not as the born child of sin, but as a naturally social animal, what is a venial sin against nature, what a mortal sin against nature."

He adds further: "I had not at first proposed to devote a whole volume to sexual inversion. It may even be that I was inclined to slur it over as an unpleasant subject, and one that it was not wise to enlarge on. But I found in time that several persons for whom I felt respect and admiration were the congenital subjects of this abnormality. At the same time I realised that in England, more than in any other country, the law and public opinion combine to place a heavy penal burden and a severe social stigma on the manifestations of an instinct which to these persons who possess it frequently appears natural and normal. It was clear, therefore, that the matter was in special need of elucidation and discussion."

There are seven chapters: (1) An Introduction on the History of Homosexuality; (2) The Study of Sexual Inversion; (3) Sexual Inversion in Men; (4) Sexual Inversion in Women; (5) The Nature of Sexual Inversion; (6) The Theory of Sexual Inversion; (7) Conclusions. Dr. Ellis's treatment of his material is similar to that of Moll, Krafft-Ebing, Westphal, etc., but is not limited to the re-elaboration of their results. He has collected new data, and undoubtedly done a service to pathological psychology. Dr. Flynt has added a curious chapter on "Homosexuality Among Tramps."

METHODOLOGISCHE BEITRÄGE ZU PSYCHOPHYSISCHEN MESSUNGEN. (Auf experimenteller Grundlage.) Von *Dr. Arthur Wreschner*. Leipsic: Johann Ambrosius Barth. 1898. Pages, 238. Price, M. 7.

Dr. Wreschner offers us in this book a record and a development of a long series of experiments on the measurement of sensations due to the pressure of weights. Though the starting-point of modern experimental psychology, this branch, he claims, has, owing to numerous disturbing circumstances, been greatly neglected. For example, the weight of the lifting arm is an error which must be eliminated, the muscles which perform the lifting must be discriminated, and further, the vari-

ous resistances which the various positions of the arm induce, must be considered. The history of the experiments extends from Weber, Fechner, and Müller through Hering, Biedermann, Bastelberger, Merkel, Leyden, Goldschneider down to the present time. Dr. Wreschner's experiments were conducted in the laboratory of Prof. Ebbinghaus in Berlin. Special instruments were constructed for avoiding the disturbing factors, many new devices were conceived for correcting the errors of time, and the results have been developed in large compass by the aid of many tables. There are five chapters, namely: (1) Introduction; (2) A Discussion of the Judgments "Greater," "Equal," and "Less"; (3) The Error of Time; (4) The Effects of Practice; and (5) The Influence of the Size of the Weights Adopted as Standard. The work is one of the series of *Schriften der Gesellschaft für Psychologische Forschung* (being Heft II., III. Sammlung) and naturally is of interest to special psychologists only. K.

NATÜRLICHE SCHÖPFUNGS-GESCHICHTE. Gemeinverständliche, wissenschaftliche Vorträge über die Entwickelungs-Lehre. Von *Ernst Haeckel*, Professor an der Universität Jena. Neunte umgearbeitete Auflage. Erster Theil: Allgemeine Entwickelungslehre. (Transformismus und Darwinismus.) Zweiter Theil: Allgemeine Stammesgeschichte. (Phylogenie und Anthropogenie.) Berlin: George Reimer. 1898.

The ninth revised German edition of Professor Haeckel's splendid work on the *Natural History of Creation* has been enriched by the addition of a large number of excellent illustrations and many new tables. Not least among the illustrations are a handsome heliogravure of Gabriel Max's famous painting *The Pithecanthropos alalus*, which was especially painted for Professor Haeckel, and a fine portrait of Professor Haeckel himself as frontispiece. Furthermore, many changes have been made in the parts treating of the systematisation and the phylogeny of organic forms. Professor Haeckel never omits to apply practically his world-view to the crying questions of the day, and he has given us anew in the preface to this, his last work, a picture of the moral and political tendencies of the end of the nineteenth century, and particularly of the grave reaction which is taking place in his own country. We trust that the work in its present new form will not fail in the beneficent influence which its predecessors have exerted. μ.

ON ORTHOGENESIS AND THE IMPOTENCE OF NATURAL SELECTION IN SPECIES-FORMATION. By *Th. Eimer*. Religion of Science Library, No. 29. Chicago: The Open Court Publishing Co. London: Kegan Paul, Trench, Trübner & Co. 1898. Pages, 56. Price, 25 cents.

The present booklet gives an accurate and comprehensive epitome of Eimer's doctrine of evolution and constitutes the gist of his large German work *Orthogenesis bei Schmetterlingen* which has just appeared. Nineteen of the most typical and illustrative cuts from the latter book have been incorporated in the present

pamphlet, so that one can readily follow here in broad outlines the specific facts which Professor Eimer has adduced in demonstration of his views. Eimer's theory rests, as is well known, on his doctrine of *organic growth*, which asserts that "transmutation takes place exactly as does the growth of any single individual "being, through the transmission of acquired characters, that is, through the given "constitution of the animal and the effects of outward influences." The fundamental proposition of the theory is that of the *orthogenetic* or *definite variation* of species, which are declared to be "essentially nothing else than stages of evolution interrupted at definite points in the developmental path, a *standstill*," which the author calls "*genepistasis*, that is, cessation of transformation on the part of a given kindred or generation (from γένος and ἐπιστάσις)." The discussions are directed specially against the position of Weismann. Professor Eimer's theories are closely allied to the work of American inquirers of the Neo-Lamarckian school and consequently will be received with interest. *p.*

AFRICA: ANTROPOLOGIA DELLA STIRPE CAMITICA (SPECIE EURAFRICANA). By *Giuseppe Sergi*. Turin: Bocca Brothers. Pages, xv+426.

This volume is number one of a *Biblioteca di Scienze Moderne* which the editors propose to issue in two series: the first in octavo form to comprehend only works of the most strictly scientific character, thus furnishing a medium for the publication of researches of Italian scientists whose work might not otherwise find its way to public notice; the second to consist of small 16mo. volumes containing matter of a somewhat popular nature. It is to the first of these series that the work before us belongs. Typographically it represents a high standard. One hundred and eighteen illustrations and a chart showing the geographical distribution of the peoples of Camitic or Hamitic stock in Africa add interest to its pages. Professor Sergi announces that it is only the first part of his treatment of the subject. In a subsequent book he will consider the Camitic stock "diffused and established in Europe from time immemorial, anterior to history and to traditions" (preface). He here treats exhaustively of the physical characteristics of the eastern and northern branches of the Camitic stock, the eastern branch including the Egyptians, the Ethiopians, the Nubians, Abyssinians, and other peoples; and the northern branch, the Lybians, Berbers, Tebuans, Fulbians, and the inhabitants of the Canary islands.

In this book Professor Sergi displays a method worthy of imitation in all such researches. Like some of the laity he finds little satisfaction in the attempts to classify human races by color of skin, hair or eyes, a cross-section of the hair, stature, cephalic index, facial form, and such like characteristics, declaring that the employment of such criteria produces a chaos, and is not a true method of classification. The continued use of such a method warrants the statement, he thinks, that "in spite of the progress of the natural sciences, systematic anthropology has not advanced a single step" (preface). What then is the method he pro-

poses to follow? I shall answer by quoting his words: "It is necessary, it seems to me, to begin over, as if up to the present no classification existed, and with a simple and rational method: to try to find out, that is, among the different physical characteristics which are constant and which are variable; to examine by means of the constant characteristics a human group without any regard to its history and its culture; to establish the characteristics which analysis has revealed, and to follow them in other human groups in geographical distribution, without preoccupying ourselves too much with secondary characteristics and with the variations which occur in them; to explain, in fine, the causes of these variations, and to determine the human variety" (preface). As to constant characteristics Professor Sergi maintains here as elsewhere that they are to be found in cranial forms. Neither the influence of external physical conditions nor the mingling of races has caused these forms to vary. Not only the forms but also the average volume of the cranium has remained from the earliest times immutable and unaltered (p. 7). Whether this is correct or not there will doubtless be some dispute. Nevertheless, the method applied is commendable.

The first problems, then, for the anthropologist to grapple with are of a general nature and may be stated as follows:

1. "Are there any established and persistent fundamental physical characteristics of a race through all time and in spite of the infiltration of different ethnical elements?

2. "Are there alterations of these physical characteristics on account of exterior physical conditions or of mixing, which may produce a hybrid stock?

3. "May it be admitted that a race, numerous and distributed over an extended area, under diverse physical conditions, may be separated into different groups which preserve the fundamental physical features unaltered, while they assume variations which distinguish and separate them?

These questions being answered, Professor Sergi is ready to consider the particular branch of the human race known as the Camitic. The following questions then arise:

1. "What are the physical characteristics of the Camitic race ancient and modern?

2. "What is the area of its distribution, and is the actual population of a given region Camitic or descendents of the ancient and primitive race?

3. "What stock, or race, or variety constitutes the Camitic, and into what and how many groups is it divided?" (See pp. 3–4.)

In answering these questions a mass of anthropological facts are exhibited that is astonishing. Not only so, but in the treatment of each people a *résumé* of the opinions of other writers makes the book a compendium of information in regard to what has been said by reputable anthropologists concerning the people of the dark continent.

Professor Sergi arrives at the conclusion that the people he studies constitute

a species, which species he denominates *Eurafricano*, using the word, however, in a sense different from that adopted by Keane and Brinton. Egyptians, Abyssinians, and Berbers are, then, according to this conclusion, of the same race as Italians, Greeks, and Spaniards. All have had a common centre of origin. Doubtless this kinship will be disclaimed. But the effort to do so may lead to further light upon the ever-interesting problem of the origin of the human race.

I. W. HOWERTH.

ON CHINESE PHILOSOPHY. By *Dr. Paul Carus*. Religion of Science Library, No. 30. Pages, 60+. Chicago: The Open Court Publishing Co. London: Kegan Paul, Trench, Trübner & Co. 1898. Price, 25 cents.

Dr. Carus's *Chinese Philosophy* treats of the development of the main characteristic features of Chinese thought, especially with reference to the *Kwa*, or *Ying* and *Yang*, system of permutations. The subject is discussed in all its philosophical bearings, the various theories to which it has given rise are dealt with, and notably Leibnitz's ingenious attempt to explain it by the binary system of numbers is thoroughly ventilated. The systems are considered as an outgrowth of the Chinese national character and are in turn made to explain much of the subsequent development of that character. There is much history, and also numerous philosophical and ethical reflexions woven into the texture of the argument, and since accounts of Chinese philosophy generally are rare, Dr. Carus's booklet will be welcome to all who would gain a glimpse into this singular and unique manifestation of the human mind. The brochure is illustrated with many diagrams and figures and is adorned with Chinese characters. *ρ.*

TRAITÉ ÉLÉMENTAIRE DE MÉCANIQUE CHIMIQUE FONDÉE SUR LA THERMODYNAMIQUE. Par *P. Duhem*, Professeur de physique théorique à la faculté des science de Bordeaux. Tome II. Vaporisation et modifications analogues. Continuité entre l'état liquide et l'état gazeux. Dissociation des gaz parfaits. Paris: A. Hermann. 1898. Pages, 378. Price, 12 francs.

The second volume of Duhem's *Traité Elémentaire de Mécanique Chimique* completes the work. The three books, of which the present volume consists, deal: (1) with vaporisation and analogous modifications, embracing saturated vapors, the theory of ebullition, fusion and allotropic modifications, dissociation, etc.; (2) with the continuity between the liquid and the gaseous states, embracing a discussion of critical points, the principle of James Thomson and the theory of Maxwell, the equation of compressibility of fluids, the specific heats of fluids, the adiabatic transformations of saturated vapors; and (3) with dissociation in systems containing mixtures of perfect gases, including the laws relative to the specific volumes and specific heats of perfect gases, mixtures of perfect gases, dissociation in homogeneous gaseous systems, density of a dissociable gaseous combination, specific heats of a dissociable gaseous combination, etc. The author, M. P. Duhem, is Professor of

theoretical physics in the University of Bordeaux, and by his numerous memoirs, in which he has applied the engines of analysis to the solution of real questions, has shown himself to be one of the first mathematical physicists of Europe. He is the author of a course of mathematical physics in two volumes, of treatises on the thermodynamic potential, hydrodynamics, elasticity, acoustics, of lectures on electricity and magnetism, and of an introduction to chemical mechanics. In the present work Professor Duhem has sought to give a rigid and purely analytical presentation of thermodynamics, in so far as the theories of that science bear upon the elucidation of chemical processes. The first volume noticed in Vol. VII. of *The Monist*, page 467, has been well received by the world of science, and doubtless the present volume which reaches the heart of the subject will be accorded a still more favorable reception. The publishers have given to it the same attractive form in point of mathematical typography, and a list of the errata in the first volume has been added. μκρκ.

DAS PHILOSOPHISCHE IN HUMES GESCHICHTE VON ENGLAND. Von *Heinrich Goebel, Dr. phil.* Marburg: N. G. Elwert. 1897. Pages, 114.

Although the author limits his expositions to a critical review of David Hume's history of England, the pamphlet may as well be regarded as a criticism of the eighteenth century Rationalism from the standpoint of to-day. The inconsistencies which Goebel points out in Hume's views of civilisation, of the purport of history, of the nature of the state, of religion and the principles of morality, hold good with slight modifications almost for every one of the *esprits forts* of the eighteenth century. Hume is one of the most representative thinkers of his age and is at the same time free from the extravagances of Voltaire, which only serves to render his views, in the best sense of the word, typical of the whole movement that prevailed in his days with all its preferences and natural drawbacks. κ.

DIE AUTONOMIE DER MORAL. Mit besonderer Berücksichtigung der Morallehre Immanuel Kants. Von *Kr. Birch-Reichenwald Aars*, Gymnasiallehrer in Kristiania. Hamburg and Leipsic: Leopold Voss. 1896. Pages, 123.

The author is scholarly and discriminative, but it is difficult to get at the trend of his inquiry. He takes Kant as his starting-point but at the same time criticises Kantian ethics for its lack of a psychological foundation. The booklet contains no table of contents, no index, no summary of results, and the reader who wants to learn what view the author takes of any special point has to read the whole pamphlet, and may even then, as the reviewer has learned by experience, not be able to find it. κρς.

RECENT PAMPHLETS AND BROCHURES.

GERMAN AND DUTCH.—The Proceedings of the Royal Göttingen Academy of Sciences invariably contain notes of interest to philosophers, and of the recent issues may be mentioned the articles of Paul Stäckel on some unpublished *Correspond-*

ence Between Gauss and Bolyai (1897, No. 1) and a note of O. Helder on the *Principles of Hamilton and Maupertuis* (1896, No. 2). The first article will be found to be an interesting contribution to the history of the development of the theory of parallels, while the second touches a metaphysical question which has long engaged the attention of the foremost mathematicians and mechanicians.—Prof. F. Lindemann, the author of the celebrated proof of the impossibility of squaring a circle by the Euclidean methods, has recently published in the form of a brochure, an extract from the proceedings of the Royal Bavarian Academy of Sciences, which treats of the *History of Polyhedra and Numeral Signs* (Munich, 1897, F. Straub). Dr. Lindemann has gone very exhaustively into his subject, and has added to his treatise a number of plates figuring some recently discovered ancient polyhedra, and also some numeral characters found on ancient prehistoric monuments. The brochure runs to one hundred and twenty-four pages and contains much of importance to the history of civilisation.—The *Revue Semestrielle des Publications Mathématiques* of the Mathematical Society of Amsterdam, fulfils somewhat the same function for mathematicians as do the *Psychological Index* and the *Année Psychologique* for psychologists. The editors are professors of mathematics in Groningen, Amsterdam, Utrecht, Leyden, and Delft. The print and arrangement are clear, and the whole forms a valuable bibliographical companion for the mathematician (Amsterdam: Delsman and Nolthenius; Paris: Gauthier-Villars et Fils).—Three of the editors of the last-named review, viz., J. C. Kluyver, D. C. Korteweg, and P. H. Schoute also publish in Amsterdam (Delsman and Nolthenius) a mathematical magazine called *Nieuw Archief voor Wiskunde*. Articles are published in the respective languages of the authors furnishing them.

We have five physiological and psychological pamphlets to mention from Germany. The first two are by Dr. M. Verworn, Professor in the University of Jena, and are entitled, respectively: *Erregung und Lähmung* (Leipsic: Georg Thieme) and *Zellphysiologische Studien am Rothen Meer*, the latter of which appeared in the Proceedings of the Royal Berlin Academy of Sciences for 1896. Professor Verworn's views are known to the readers of *The Monist*, his attitude towards vitalism and his relegating the problem of life to cellular psychology being distinctive.—Dr. Th. Ziehen is Professor of Psychology in the same University as Dr. Verworn. His books are well known and a brief article by him on *Sensation* (*Empfindung*) which he has recently written for the *Real-Encyclopädie der Gesammten Heilkunde* (Urban & Schwarzenberg, Vienna and Leipsic) may be consulted with profit.—The phenomena of dreams, hypnotism, and suggestion have been recently engaging much of the attention of German psychologists and notably so at the University of Munich. Dr. Theodor Lipps, whose large work on the *Æsthetics of Space* we reviewed in the last *Monist*, has published a lecture on *The Psychology of Suggestion* (Leipsic: Barth, 1897). The address is mainly directed against that conception of science which would explain all psychological problems by corresponding theories of physiology.—The last of the five pamphlets

alluded to is by Dr. Carl Max Giessler of Erfurt and is entitled *Die physiologischen Beziehungen der Traumvorgänge* (Halle: Max Niemeyer).

In Philosophy, finally, we have (1) a *Kritische Analyse von Arthur Colliers Clavis universalis*, a discussion of a much neglected philosopher, by Arnold Kowalewski, submitted as a dissertation for the Doctorate at Greifswald; (2) an essay of forty-eight pages by Dr. Ernst Tuch on the import of the *Occasionalistic Theory of Lotze's System* (Berlin: Mayer and Müller) which will contain remarks of interest to students of Lotze, now so numerous in the United States and England; (3) a discussion of the *Æsthetic Teachings of Trendelenburg*, by Dr. Wilhelm Deike of Helmstedt; and lastly (4) a pamphlet *Individualität: Pädagogische Betrachtungen* (Eduard Heinrich Mayer, Leipsic, 1897) by a German-American fellow-citizen, Karl Knortz of Evansville, Indiana.

ITALIAN AND FRENCH.—Dr. Giuseppe D'Aguanno, Professor of the Philosophy of Law in the University of Palermo, and editor of a new magazine *Rivista di Storia e Filosofia del Diritto*, is exhibiting creditable activity in the field of philosophical jurisprudential criticism. He has recently published three pamphlets entitled; (1) *La Filosofia Etico-Giuridica da Kant a Spencer* (Part I.); (2) *Appunti di Lezioni di Filosofia del Diritto: I sistemi idealisti tedeschi posteriori ad E. Kant* (Fichte, Schelling, Hegel, etc.); (3) *Lo Spiritualismo e il Positivismo nella Filosofia Giurdica Contemporanea;* the last two of which are connected with his course of lectures in the University. All these pamphlets are published in Palermo. —Italian sociologists seem much addicted latterly to the study of social conditions in the United States, though as a rule their investigations are not at first hand. We have recently received an Italian pamphlet by Augusto Bosco on *Homicide in the United States of America* (Rome: G. Bestero, 1897), however, which seems to be a careful study; at least the author has made use of the best official reports of this country.—M. Henry Lagrésille has ventured upon the enunciation of his philosophical views of the universe in a pamphlet published by Berger-Levrault & Cie., Paris, and entitled *Quel est le point de vue le plus complet du Monde? et Quels sont les principes de la Raison universelle?* M. Lagrésille believes that God exists because universal reason exists. "I reason; therefore God exists." The author's methods are certainly not the methods of what is now considered ideal exact philosophy, and his discussions suffer accordingly.—Of the fruitful and uninterrupted activity of Madame Clémence Royer we have but to mention one recent product, *La Question Religieuse* (Paris, 1898), a problem which this distinguished lady discusses with her wonted insight and erudition.—Educators will be interested in the *Discourses* of MM. Guillaume de Greef, Louis de Brouckère, and Eugène Robert, delivered at the commencement exercises of the New University of Brussels, 1896. The New University of Brussels is a practical embodiment of the most modern ideas of education, and the discussions of the gentlemen just mentioned on *Integral Education and Positive Philosophy* have a distinct value.—M. G. de Vasconcellos-Abreu, the distinguished Professor of Sanskrit in the University of

Lisbon, has recently published in French a note on *The Symbolism of Numbers in the Traditional and Popular Magical Receipts of Europe* (Leyden: E. J. Brill). The Lisbon Professor claims to have established their analogy with the magical formulas of the *Atharvavéda*. He believes that the substitution of symbolical words for numbers and the symbolism of numbers generally, has sprung from traditions originally brought from India, and have taken root in a soil prepared for them by the Pythagorean and Gnostic doctrines, as well as by the religious practices of Christianity.—M. Alfred Binet has undertaken a new enterprise in his *L'Intermédiaire des Biologistes*. The magazine is different from the *Centralblätter* of the Germans, and the *Archives de Physiologie* of the French. It is to be a sort of *Notes and Queries* for biologists, who will find here a journal in which debated questions may be propounded and answered, and a record of bibliography of the subject kept. The Assistant Editor is Victor Henri and the publishers Schleicher Frères, Paris.

AMERICAN AND ENGLISH.—Dr. George Bruce Halsted has enriched his *Neomonic Series* by a translation from the Russian of Lobachévski's *New Principles of Geometry, With Complete Theory of Parallels* (Austin: Texas). Dr. Halsted is gradually accumulating and making accessible to American and English readers all the sources of the Non-Euclidean geometry. The present translation is the first made from the Russian in any language of Lobachévski's *New Principles*.—We have also received the first instalment of the publications of the University of Pennsylvania, New Series, No. 1. It is in the department of mathematics and is entitled *Contributions to the Geometry of the Triangle*, by Robert Judson Aley, Professor of Mathematics in the University of Indiana. The brochure is accompanied by a well-made plate containing the figures needed for demonstrations.—Prof. G. Galbraith of Toronto has had his address on the *Groundworks of Dynamics*, which he delivered in 1897 before the American Association, printed in separate form. Prof. Galbraith emphasises the necessity of the study of the historical development of mechanical ideas, as also the investigation of their physical contents as distinguished from their mathematical form. (The Salem Press, Salem, Mass.)—*The Logical Copula and Quantification of the Predicate* is the title of a pamphlet of 19 pages by Edward Adamson, in which are treated the generalised description of the copula, the quantification of terms, the law of individuality, and the privative concept. The author regards these topics as new, true, and of great utility. (London: David Nutt. 1s. net.)

N. B.—Reviews of the following books have, for lack of room, been crowded out of the present *Monist: The Will to Believe*, by Prof. W. James (Longmans).—*Mental Development: Social and Ethical Interpretations*, by Prof. J. M. Baldwin (Macmillan).—*The Social Mind and Education*, by George Edgar Vincent (Macmillan).—*La structure du protoplasma et les théories de l'hérédité*, by Yves De-

lage (Paris, Schleicher Frères).—*The Non-Religion of the Future*, by M. Guyau (Henry Holt & Co., New York).—*The Evolution of the Idea of God*, by Grant Allen (Henry Holt & Co., New York).—*Geschichte der neueren deutschen Psychologie*, by Max Dessoir (Carl Duncker, Berlin).—*Outlines of Sociology*, by Lester F. Ward (Macmillan).—*Manual of Ethics*, by Prof. John S. MacKenzie (London, W. B. Clive), etc.

ERRATUM.

To the Editor of The Monist:

My attention has been called by the author of the monograph on *Living Substance* to an error in my review (*The Monist*, January, 1898). The statement on page 310, line 22, that certain changes in the embryos of echinoderms were "pointed out by Dr. Whitman" should have read were "pointed out *to* Dr. Whitman."

AMHERST COLLEGE, Jan. 31, 1898. JOHN M. TYLOR.